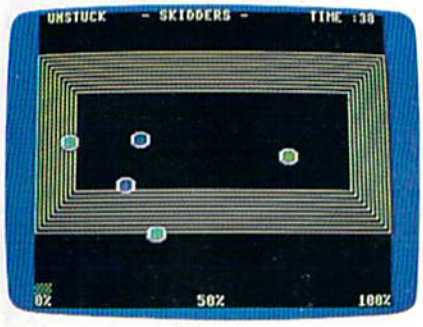
The Winter Consumer Electronics Show

COMPUTE!'s GAZETTE

$3.00
April 1987
Issue 46, Vol. 5, No. 4
02220 $4.25 Canada

FOR **COMMODORE** PERSONAL COMPUTER USERS

A first-hand look at exciting new hardware and software for Commodore owners



Skidders

A fast, colorful arcade-action game for the 128.

Turbo Save

Save files up to five times faster on the 64 and 1541—and up to six times faster on the 128 and 1571.

Omicron

Rookie or expert will face a stiff challenge in this high-velocity arcade-style game for the 64.

Also In This Issue:

Print Shop To *GEOS* Converter
User Group Update
Software Reviews
And More

Easy Disk LOAD And SAVE

Load-and-run or save-and-verify any 64 program with one command.

0 71486 02220 6 04

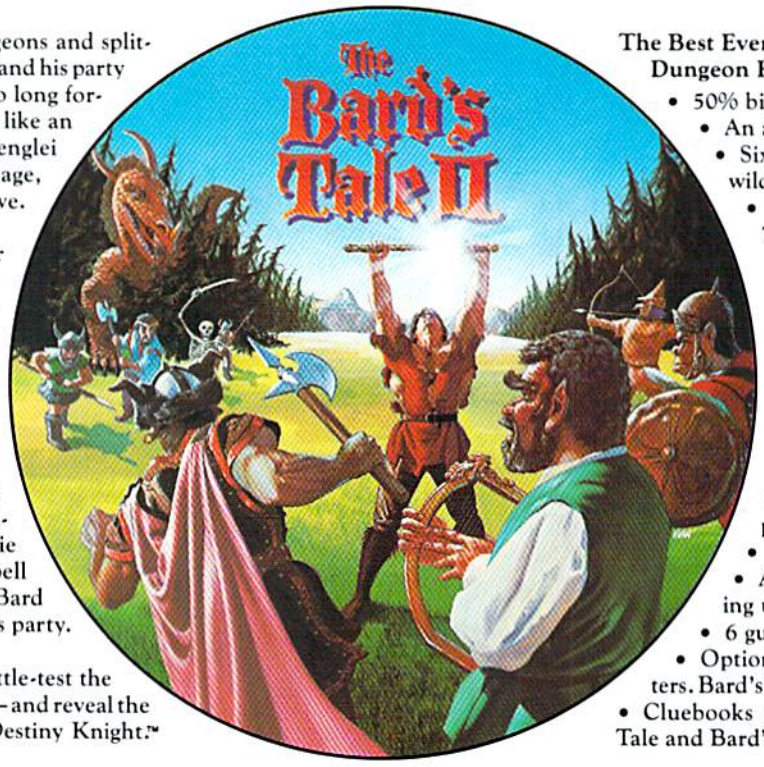
"The Bard is Back!"

From impossible dungeons and split-second snares, the Bard and his party emerge. The Sceptre, so long forgotten, gleams with power like an exploding sun. Even Phenglei Kai, the ancient archmage, bows his head in awe.

"I smell serpents!" Slipfinger squeals, stealing away like the thief he is. Two archdragons slither out of the ground, their eyes burning with the relentless fury of treasure lost.

Protected behind the flame lizards, beyond the reach of normal weapons, a cackling wizard begins the eerie chants of a death spell. A spell that can finish the Bard and his party.

The time has come to battle-test the magic of the Destiny Wand – and reveal the awesome powers of The Destiny Knight.™



The Best Ever
Dungeon Role-Playing Game

- 50% bigger than Bard's Tale.™
- An all-new story line.
- Six cities and a huge overland wilderness to explore.
- Dozens of new spells – 79 spells in all.
- New real-time dungeon puzzles. You have to get through them before the clock stops ticking.
- Summon and name monsters to become a permanent part of your party.
- More strategy in combat encounters – the weapons and spells you choose depend on the enemy's distance.
- A bank and casino.
- A starter-dungeon for building up your low-level characters.
- 6 guilds for easier game saving.
- Optional use of Bard's Tale characters. Bard's Tale experience not required.
- Cluebooks available for both Bard's Tale and Bard's Tale II.™

You get a new class of magic user – the Archmage. With 8 powerful spells like Heal All, Fanskar's Night Lance, and the awesome Mangar's Mallot.

Snarls of defiance are heard from 12 Kner Drones (10'), and 6 Pickpockets (10').
Will your stalwart band choose to (F)ight or (R)un?
Kner Drones

There are over 100 monstrous, like this Kner Drone. Many animated. All dangerous.

25 scrolling dungeon levels. All in color. All 3-D. Including 7 different Snares of Death, a new kind of real-time puzzle.

The Bard's Tale II

The Destiny Knight

from

ELECTRONIC ARTS™

Optional use of characters from Ultima III™ or Bard's Tale™

HOW TO GET IT: Visit your retailer, or call 800-245-4525 (in CA call 800-562-1112) for VISA or Mastercard orders. To buy by mail, send a check, money order, or VISA or Mastercard information to Electronic Arts, P.O. Box 7530, San Mateo, CA 94403. The price is $39.95 for the Commodore 64 version. Add $5 for shipping and handling ($7 Canadian). Allow 1-4 weeks for delivery. The Bard's Tale II and Electronic Arts are registered trademarks of Electronic Arts. Ultima is a registered trademark of Richard Garriott. Commodore is a trademark of Commodore Electronics Ltd. For a copy of our complete catalog, send 50¢ and a stamped, self-addressed envelope to Electronic Arts Catalog, 1820 Gateway Drive, San Mateo, CA 94404.

SPORTS!

From the incredible realism and playability of Football...

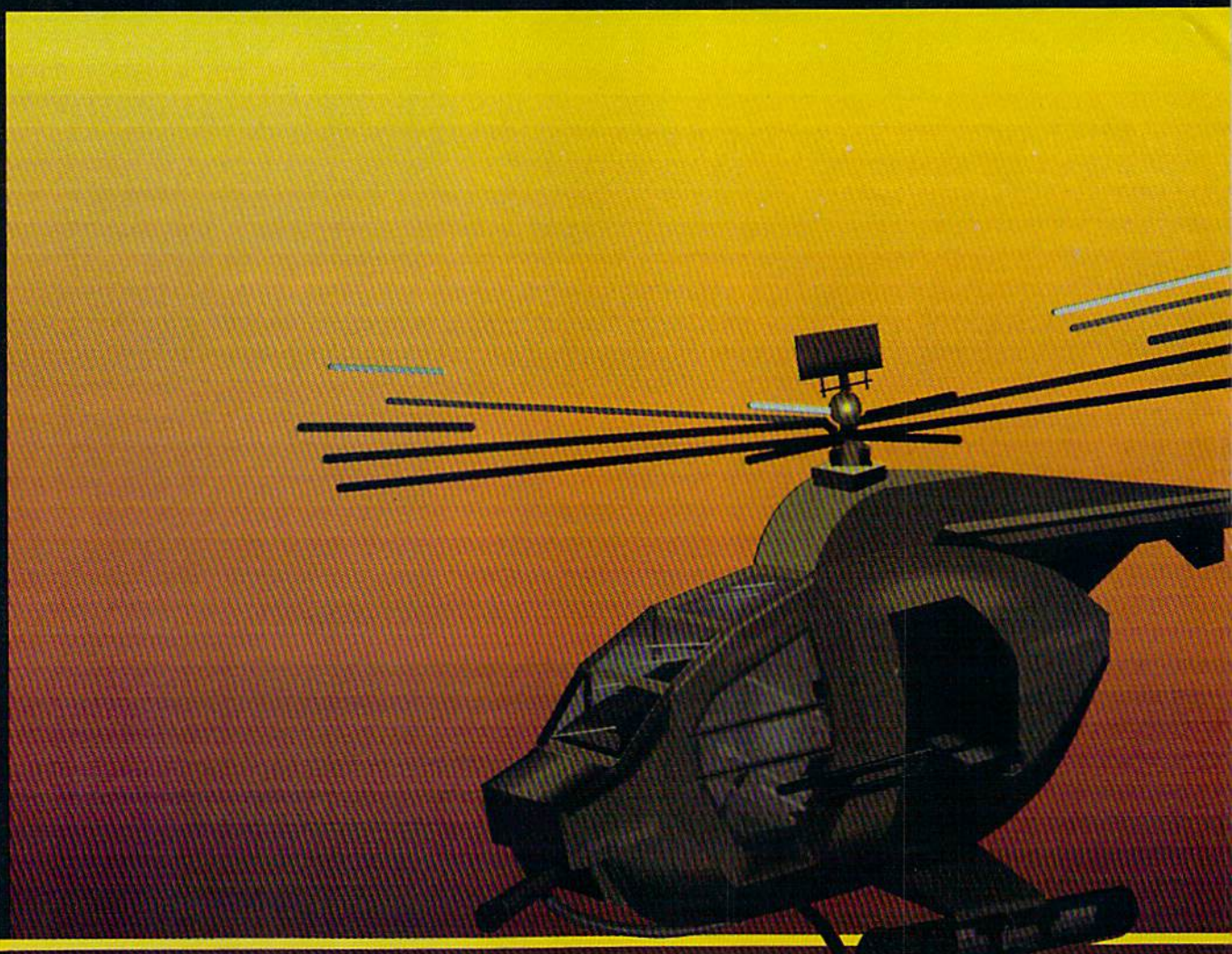
...to the sophisticated statistical simulation of Baseball...

...SubLOGIC. The State of the Art in Sports Simulations.

See Your Dealer. For additional product ordering information or the name of the dealer nearest you, call (800) 637-4983.

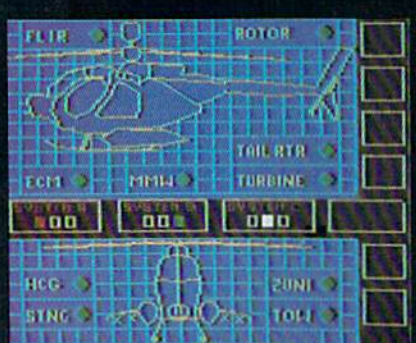
subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

Order Line: (800) 637-4983
(except in Illinois, Alaska, and Hawaii)



In a market full of helicopter simulations like Super Huey II, Gunship, and Infiltrator, it's nice to find a product like ThunderChopper that flies high above the rest!

Colonel Jack Rosenow USAF (Ret.), President of ActionSoft Corp., has the experience to provide all of the helicopter action and strategy you've been looking for! ThunderChopper incorporates the most advanced graphics, flight systems, and game-playing factors to provide a sensational balance of strategy and fun:



- Action-packed animated graphics include real 3D scenery and airborne threats. The competition's graphics just don't compare.
- A sophisticated instrument panel lets you scan all vital information at a glance whether performing combat, exploration or rescue operations. ThunderChopper's advanced instrumentation includes Forward-Looking Infra red, CO2 laser radar, zoom television, and ECM. Armament includes TOW and Stinger missiles, a Hughes Chain Gun, and Zuni rockets.
- Better program and documentation design gets you up flying exciting combat missions in minutes.

As Colonel Jack says: "ThunderChopper is the ultimate in helicopter action and realism. Nothing else even comes close. No other simulation can boast this much fun!"

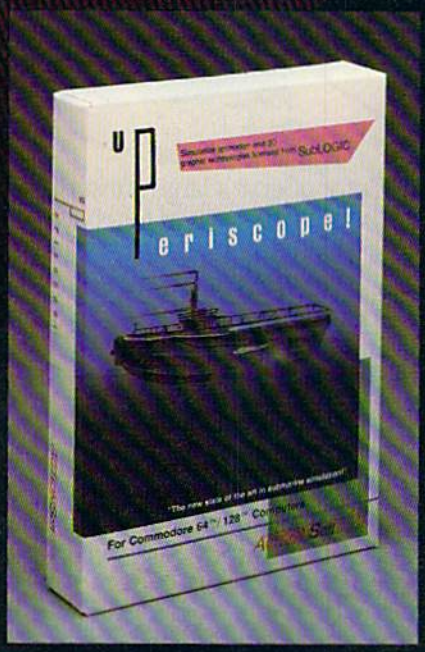
ThunderChopper

Simulation animation and 3D graphic technologies licensed from SubLOGIC

Up Periscope!

The new state of the art in submarine simulation. The superior strategic play action and 3D animated graphics of this simulation put it generations ahead of the pack.

See Your Dealer...
Or write or call us for more information. ThunderChopper and Up Periscope! are available on disk for the Commodore 64/128, Apple II, and IBM PC line of personal computers for the suggested retail price of $29.95. For direct orders please specify which computer version you want. Include $2.00 for shipping and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.



- $29.95 -
Better Engineering at a Better Price

© 1986 ActionSoft Corporation
3D Graphics and special effects courtesy SubLOGIC Corp.
Commodore 64 and Commodore 128 are trademarks of Commodore Electronics Ltd.
Apple II is a trademark of Apple Computer, Inc.
IBM is a registered trademark of International Business Machines Corp.

ACTIONSoft
GENERATIONS AHEAD IN STRATEGY ACTION SOFTWARE
122-4 S RACE ST URBANA, IL 61801
(217) 367-1024

Is Getting The Answer To Software Problems A Bigger Problem Than The Problem?

Don't stay on hold when there's help online from CompuServe® Software Forums.

The new upgraded version of your software locks up. And every time you reboot, you get stuck in the same place in the program.

You've chucked the manual, because you've done exactly what it tells you to do six times already. So you call the software company.

Now you spend half a day beating your head against a brick wall of busy signals, ranting at recorded messages, hanging around on hold. And you still don't get the solution to your problem.

Meanwhile, progress is stopped and your profits are dribbling away. But wait. There's help...

Several prominent, progressive software publishers recognize this problem, and working with CompuServe, have developed a solution—CompuServe Software Forums.

Now you can go online with experts from the companies that produced your software and get prompt, written answers to your specific problems. You can even talk with the actual software developers.

Aldus®, Ashton-Tate®, Autodesk®, Borland International®, Creative Solutions®, Digital Research®, Living Videotext®, Lotus® Inc., Microsoft®, MicroPro®, Misosys Inc.® and Software Publishing® all have CompuServe Software Forums. And we keep adding more.

CompuServe's large subscriber base also puts you in touch with thousands of other, often more experienced, users of the same software. You'll find they can give you lots of creative ways to get the most out of your software.

And software forums are the best way to learn about product updates, new product announcements, new ways to expand the uses of your software, and offer free uploads of your own programs.

Our online electronic magazines frequently publish software reviews. And you can find help for many other software products in our other computer-related forums for IBM®, Tandy®, Atari®, Apple®, Commodore®, TI® and others.

The last thing you need when you've got a software problem is a bigger problem getting answers. So, from now on, get prompt, informed answers on CompuServe Software Forums.

To buy your CompuServe Subscription Kit, see your nearest computer dealer. Suggested retail price is $39.95.

To order direct or for more information, call 800-848-8199 (in Ohio, 614-457-0802).

If you're already a CompuServe subscriber, just type GO SOFTWARE at any ! prompt.

CompuServe®

Information Services, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, OH 43220

An H&R Block Company

GAZETTE contents

April 1987 Vol. 5, No. 4

features

The 1987 Winter Consumer Electronics Show *Lance Elko*	22	*
Commodore Goes Cloning in the U.S. *Selby Bateman*	26	*
Commodore's New Amigas *Selby Bateman*	30	*
Fine-Tuning the Software Market *Kathy Yakal*	34	*

reviews

Tass Times in Tonetown *Neil Randall*	56	64
Robot Rascals *David and Robin Minnick*	58	64
Roadwar 2000 *George Miller*	60	64
Certificate Maker *David and Robin Minnick*	62	64
I Am the C128 *Art Hunkins*	63	128

games

Omicron *Sean Wagle*	44	64
Skidders *I. J. Lyles, Jr.*	52	128

education/home applications

Improvisor *Donald Eddington*	46	64
Computing for Families: My Seven-Year-Old Hacker *Fred D'Ignazio*	76	*

programming

Print Shop* to *GEOS *Bruce Wilkinson*	66	64
The Versatile CIRCLE *Paul W. Carlson*	68	128
Turbosave 128 *Michael Henry*	70	128
Turbosave 64 *William Voosen*	71	64
Screen Mapper *Jerome E. Reuter*	73	128/64/+4/16
LIST Formatter *Richard Richmond*	74	128/64/+4/16
Easy Disk LOAD and SAVE *Joseph Heaverin*	75	64
Hints & Tips: A Simple Menu *Michael A. Lang*	77	128/64
BASIC for Beginners: GOTO and GOSUB *Larry Cotton*	78	128/64/+4/16/V
Machine Language for Beginners: Between BASIC and Machine Language *Richard Mansfield*	80	128/64
Power BASIC: Countdown Timer *Dave Flater*	82	128/64

departments

The Editor's Notes *Richard Mansfield*	6	*
Gazette Feedback *Editors and Readers*	12	*
User Group Update	72	*
Horizons: In Memory *Todd Heimarck*	83	64
Simple Answers to Common Questions *Tom R. Halfhill*	84	*
Bug-Swatter: Modifications and Corrections	85	*
News & Products	86	*

program listings

COMPUTE!'s Gazette Author's Guide	42	*
How to Type In COMPUTE!'s Gazette Programs	91	*
The Automatic Proofreader	92	128/64/+4/16/V
MLX: Machine Language Entry Program for Commodore 64 and 128	93	128/64
Advertisers Index	132	*

*=General, **V**=VIC-20, **64**=Commodore 64, **+4**=Plus/4, **16**=Commodore 16, **128**=Commodore 128

COMPUTE!'s GAZETTE is published monthly by **COMPUTE!** Publications, Inc., 825 7th Avenue, New York, NY 10019 USA. Phone: (212) 265-8360. Editorial offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic Subscriptions: 12 issues, $24 POSTMASTER: Send address changes to *COMPUTE!'s GAZETTE*, P.O. Box 10957, Des Moines, IA 50340. Second class application pending at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright ©1987 by **COMPUTE!** Publications, Inc. All rights reserved. ISSN 0737-3716.

COMPUTE! Publications, Inc. is part of ABC Consumer Magazines, Inc., One of the ABC Publishing Companies: ABC Publishing, President, Robert G. Burton; 1330 Avenue of the Americas; New York, New York 10019.

editor's notes

One million Commodore 128s have sold this past year, and the Commodore 64 and 64C have continued to sell extremely well. Astonishing the competition, industry pundits, and even some people at Commodore itself, the enduring popularity of the Commodore eight-bit line is a testimony to the excellence of its fundamental design. The Commodore 64 has become the Volkswagen of the computer market, the most widely accepted personal computer ever.

The recent Consumer Electronics Show (see the feature beginning on page 22) offered additional evidence of the 64's continuing strength: There were many new software and peripheral products introduced in support of the 64; the quality of the software, particularly graphics and sound, continues to improve as designers find new ways to exploit the 64's features; and observers are now predicting that the 64 will continue to sell *into the 1990s*. All this points to a machine which was initially so well designed that it can compete effectively against technological progress in a market notorious for its rapid technical change.

Surrounding and supporting the 64 and its offspring are new products which remedy its weaknesses and amplify its strengths: new, faster disk drives; memory expansion; even hard disks. But the underlying design remains the same through all these changes. What is it that makes the 64 so special, so durable?

For one thing, it was initially, and remains today, a breakthrough in price/performance. At the time of its introduction, the 64 offered unparalleled sound capability via its SID chip, which represented a leap forward in computer sound capabilities, and still holds its own against the majority of other personal computers available now.

Another chip, the VIC, provides efficient control over video: high-resolution, multicolor, custom characters, and sprites. Programmers continue to be impressed by how easy it is on the Commodore systems to manipulate character sets and sprites. Compared to that of some competing systems, access to—and control over—the VIC chip is particularly efficient. It's one major reason why software engineers and professional programmers continue to push back the boundaries of what's possible visually on the 64.

A related issue is the excellent Commodore version of Microsoft BASIC. For one thing, there are no major bugs in this language, a less common achievement than most people realize. And from the start, programmers have been impressed with the special effects possible directly from 64 BASIC. Sprites are easy to work with, even for beginners. The screen map for character mode makes designing effective animation relatively painless. Color mapping permits dazzling graphics with a minimum of fuss. Also, there's enough memory, a full 64K of RAM, to write sophisticated, full-featured programs.

The computer's popularity has spawned an extraordinarily rich base of documentation and utility support to assist programmers in their efforts to create new software for the Commodore 64. If you want to know something about the 64, you can find it in one of the hundreds of books published about this machine. Likewise, there are dozens of powerful utilities, software tools, sprite editors, and such.

Another factor which continues to help sell the 64 is its price. Introduced at $600, it can now be purchased new for around $160. Peripherals, too, can be quite reasonable. If you want to start telecomputing, you can find modems for the 64 for as little as $30. Light pens, graphics tablets, and a host of other add-ons are all remarkably inexpensive, relative to many competing lines. And, of course, there's a tremendous amount of quality software—both traditional favorites and the new packages which continue to be introduced and continue to sell well.

Its low cost and the consequent high price/performance ratio also make the 64 attractive to specialists. Niche markets have sprung up using the 64 for everything from timing scientific experiments to controlling burglar alarm systems and monitoring the weather. Where previously a specially designed machine would have been required, now an inexpensive, fully programmable, general-purpose computer can be assigned to one task.

Overall, the 64 and its family can be expected to continue to sell well for the next several years. And COMPUTE! Publications will continue to supply some of the best applications, games, and utilities for this outstanding and surprisingly durable machine.

Richard Mansfield
Editorial Director

TEST DIVE ONE FOR YOURSELF.

In their day, they ruled over three quarters of the earth's surface.

During WWII, they viciously brought Britain to her knees. And Japan to the ground.

These were the silent killers: Tench. Gato. U-Boat.

And now, they return. In this, the most realistic, all-encompassing simulation ever created for the personal computer.

You will command one of six types of American subs or German Kriegsmarine U-Boats, during any year from 1939 to 1945. You'll perform one of over 60 missions. Or you'll engage in the most difficult task of all: To make it through *the entire war.*

Each vessel is completely unique and painstakingly authentic, so you'll have a lot to learn: Navigation. Weather. Radar.

And the contents of a vital target book, among other things.

Your arsenal will include deck and anti-aircraft guns. Torpedoes. And mines.

But even all that may not be enough.

Because besides the risk of bumping a depth charge or facing a killer Destroyer, you'll still have to contend with the gunfire of enemy aircraft.

No simulation has ever had the degree of authenticity, gut-wrenching action or historical accuracy of this one.

The first release of our new Masters Collection. And a challenge of unbelievable depth.

EPYX®

Apple II & compatibles, Apple IIGS, Atari ST, C64/128, IBM & compatibles, Macintosh.

TAKE OUR PREVIEW DISK FOR A SPIN. Drop this coupon in the mail with your check or money order, and we'll gladly send you to the South Pacific to have it out with an enemy fleet.

Mail to Sub Battle Preview, P.O. Box 8020, Redwood City, CA 94063.

	Quantity		Total
Apple II & compat. (128K)	_____	*$1.50 ea.*	_____
Commodore 64/128	_____	*$1.50 ea.*	_____
IBM PC & compat.	_____	*$1.50 ea.*	_____
Atari ST	_____	*$2.75 ea.*	_____
Macintosh	_____	*$2.75 ea.*	_____
Apple II GS	_____	*$2.75 ea.*	_____
Total Disks Ordered	_____	*Total Enclosed*	_____

Name _____ *Phone* ( ) _____

Address _____ *Age* _____

City/State/Zip _____

Canadian orders please add 50¢ for additional postage.

Please allow 4 to 6 weeks for delivery. Offer expires 8/30/87 and is valid only in the continental U.S. and Canada. Void where prohibited.

20

The No. 1 battery. The ship's heart.

Sea guard radar stub.

Your ammo.

The 360° periscopes.

The sealed control room. Your HQ.

Independent generator & diesel engines.

Salt water tank for trimming and compensating.

5" 25 cal. gun.

Officer's quarters.

Water purification.

COMPUTE! Publications, Inc.
One of the ABC Publishing Companies

Publisher James A. Casella
Founder/Editorial Consultant Robert C. Lock
Editorial Director Richard Mansfield
Managing Editor Kathleen Martinek
Executive Editor Selby Bateman
Editor Lance Elko
Assistant Editor Rhett Anderson
Production Director Tony Roberts

Editors
Tom R. Halfhill, Editor, COMPUTE!'s Atari ST Disk & Magazine; Stephen Levy, Editor, COMPUTE! Books Division; Ottis R. Cowper, Technical Editor

Assistant Editors
Gregg Keizer, Ann Davies (Books); George Miller, Dale McBane, (Technical); Philip I. Nelson (COMPUTE! Magazine); Todd Heimarck, (COMPUTE!'s Atari ST Disk & Magazine); Kathy Yakal, Assistant Features Editor; Tammie Taylor, Karen Uhlendorf, Karen Siepak, Copy Editors; Caroline Hanlon, Editorial Assistant; David Hensley, Submissions Reviewer

Editorial Programmers
Patrick Parrish (Supervisor), Tim Victor, Tim Midkiff

Programming Assistants
David Florance, Troy Tucker

Administrative Staff
Executive Assistant, Debi Nash; Julia Fleming, Iris Brooks, Mary Hunt, Sybil Agee

Production
Irma Swain, Production Manager; Janice Fary, Art & Design Director; Lee Noel, Assistant Editor, Art & Design; De Potter, Mechanical Art Supervisor; Terry Cash, Carole Dunton, Typesetting

Artists
Robin Case (Publications); Harry Blair, Illustrator

Associate Editors
Jim Butterfield (Toronto), Fred D'Ignazio (Alabama)

Customer Service
Diane Longo, Customer Service Manager; Orchid Tamayo, Dealer Sales Supervisor; Cassandra Greene, Customer Service Supervisor

Receptionist, Anita Armfield

Warehouse Manager, John Williams

President James A. Casella
Vice President, Editorial Director Richard Mansfield
Vice President, Advertising Richard J. Marino
Vice President, Finance & Planning Christopher M. Savine

Advertising Sales
Richard J. Marino, Vice President, Advertising Sales; Peter Johnsmeyer, Director of Advertising Sales; Bernard J. Theobald, Jr., Associate Advertising Director; Kathleen Hanlon, Production Coordinator

Sales Representatives

Jerry Thompson	415-348-8222
Lucille Dennis	415-348-8222
Tom Link	212-315-1665
Harry Blair	919-275-9809

Address all advertising materials to:
Kathleen Hanlon, COMPUTE!'s GAZETTE
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

Sales Offices

Northeast	212-315-1665
Mid-Atlantic	212-315-1665
Southeast	212-275-9809

Sales Offices, Jules E. Thompson, Inc.
1290 Howard Avenue
Suite 303
Burlingame, CA 94010

Midwest	312-726-6047
Texas	713-731-2605
Pacific Northwest	415-348-8222
Northern CA	415-348-8222
Southern CA	415-348-8222
Arizona	415-348-8222
New Mexico	415-348-8222
Colorado	303-595-9299

MPA
Member
ABC
Audit Bureau of Circulations

COMPUTE! Publications, Inc., publishes
COMPUTE! ***COMPUTE! Books*** ***COMPUTE!'s GAZETTE***
COMPUTE!'s GAZETTE Disk ***Apple Applications***
COMPUTE!'s Atari ST Disk & Magazine

Editorial Office:
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

Corporate Offices:
825 7th Avenue, New York, NY 10019

Customer Service:
P.O. Box 5038, F.D.R. Station, New York, NY 10150

Telephone: (In NY) 212-887-8525;
(In U.S.) Toll free 1-800-346-6767
Office Hours: 8:30 AM to 4:30 PM Monday–Friday

Subscription Orders

COMPUTE!'s GAZETTE
P.O. Box 10957, Des Moines, IA 50340

TOLL FREE
Subscription Order Line
1-800-247-5470
In IA 1-800-532-1272

COMPUTE!'s GAZETTE
Subscription Rates

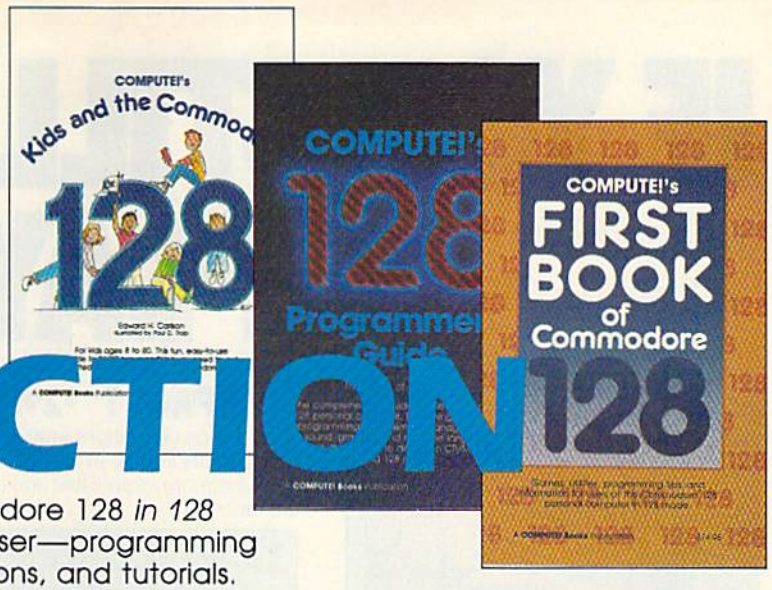
(12 Issue Year): US (one year) $24. Canada, Mexico and Foreign Surface Mail $30. Foreign Air Mail $65.

The COMPUTE!'s GAZETTE subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE!'s GAZETTE, P.O. Box 10958, Des Moines, IA 50950. Include a note indicating your preference to receive only your subscription.

Authors of manuscripts warrant that all materials submitted to COMPUTE!'s GAZETTE are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!'s GAZETTE, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of **COMPUTE!** Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1987 **COMPUTE!** Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication will be returned if author provides a self-addressed, stamped envelope. Where programs are included in an article submission, a tape or disk must accompany the submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper and lowercase, please) with double spacing. Each article page should bear the title of the article, date, and name of the author. **COMPUTE!** Publications, Inc., assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of **COMPUTE!** Publications, Inc. **COMPUTE!** Publications assumes no responsibility for damages, delays, or failure of shipment in connection with authors' offer to make tape or disk copies of programs published herein.

PET, CBM, VIC-20, Commodore 64, Plus/4, 16, and 128 are trademarks of Commodore Business Machines, Inc., and/or Commodore Electronics Limited. Other than as an independent supplier of quality information and services to owners and users of Commodore products, **COMPUTE!** Publications, Inc., is in no way associated with Commodore Business Machines, Inc., or any of its subsidiaries.

COMPUTE! Books' COMMODORE 128 COLLECTION



These outstanding books for the Commodore 128 *in 128 mode* contain something for every 128 user—programming guides, memory maps, games, applications, and tutorials. And all programs take full advantage of the 128's power: Each is used in 128 mode. All the listings are carefully tested, and the information is dependable and current. Plus, each book is written in COMPUTE!'s popular, easy-to-understand style to offer you hours of entertainment, education, and challenge.

Look for these titles at your local computer or book store, or order directly from COMPUTE! Books.

To order, call toll-free 1-800-346-6767 (in NY 212-887-8525), or write COMPUTE! Books, P.O. Box 5038, F.D.R. Station, New York, NY 10150.

COMPUTE!'s Kids and the Commodore 128

Edward H. Carlson
$14.95
ISBN 0-87455-032-7 275 pages

Over 30 sections—all with instructor notes, lessons, assignments, and lively illustrations—will entertain and amuse you as you learn about this powerful computer. For kids and adults alike.

128 Machine Language for Beginners

Richard Mansfield
$16.95
ISBN 0-87455-033-5 392 pages

A new edition of COMPUTE!'s bestseller, *Machine Language for Beginners*, this book includes everything needed to learn to program the 128 effectively: numerous programming examples, memory-management tutorials, and a dictionary of all major BASIC words and their machine language equivalents. Plus, there's a high-speed, professional-quality, label-based assembler that's both easy to use and full of special features that take full advantage of the extra speed and memory of the 128. *A disk is also available for $12.95 which includes programs in the book, 335BDSK.*

COMPUTE!'s 128 Programmer's Guide

Editors of COMPUTE!
$17.95
ISBN 0-87455-031-9 444 pages

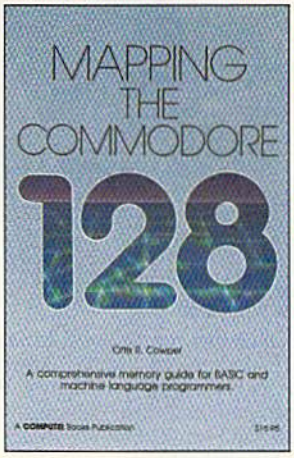
The complete guide to the Commodore 128, this book thoroughly explores BASIC 7.0; shows you how to create graphics, music, and program peripherals; and introduces you to machine language programming. A clear yet exhaustive reference and tutorial to the 128.

COMPUTE!'s First Book of the Commodore 128

Edited
$15.95
ISBN 0-87455-059-9 217 pages

Games, programs, and tutorials for the Commodore 128 exclusively in 128 mode that teach everything from how to create windows to programming sound and making disks autoload. There's even a map of all the important memory locations. *A disk is available for $12.95 which includes all the programs in the book, 599BDSK.*

New Release



Mapping the Commodore 128

Ottis R. Cowper
$19.95
ISBN 0-87455-060-2 689 pages

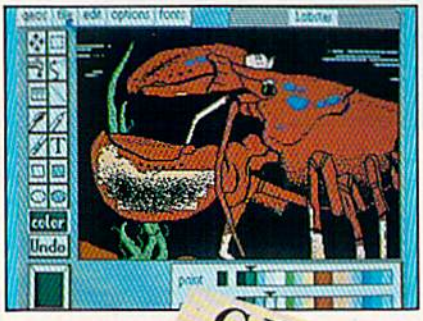
This clearly written, comprehensive memory map and programmer's guide, by the technical editor of COMPUTE! Publications, provides a detailed explanation of the inner workings of the Commodore 128 computer. Topics include memory management, BASIC 7.0, I/O chip registers, the operating system, system RAM, and much more. This is an important reference for both BASIC and machine language programmers.

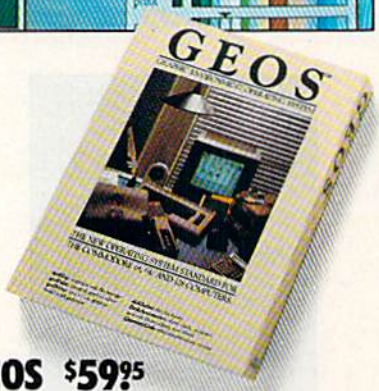
NC residents please add 5 percent and NY residents add 8.25 percent sales tax.
Add $2.00 shipping and handling per book or disk; $5.00 airmail.
Please allow 4–6 weeks for delivery.

COMPUTE!™ Publications, Inc. abc
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies

COMPUTE! books are available in Canada from McGraw-Hill, Ryerson Ltd., 330 Progress Ave., Scarborough, Ontario, Canada M1P 2Z5.

IF YOU STILL THINK CO
PLAY AROUND



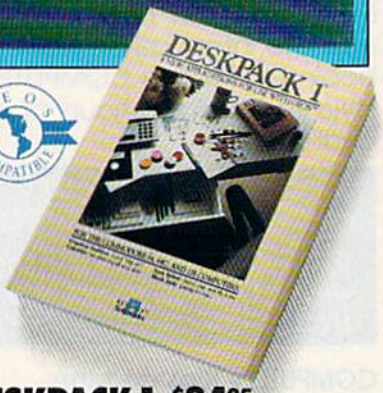


GEOS $59.95

The Graphic Environment Operating System that opens up a whole universe of new possibilities for Commodores. With geoWrite, geoPaint, fast-loading diskTurbo and support for all GEOS-compatible applications.

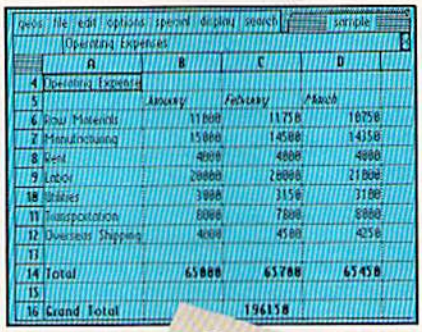
FONTPACK 1 $29.99

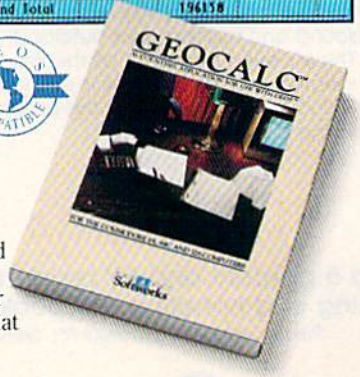
A collection of 20 more fonts for use with GEOS applications, in various shapes and sizes for more expressive and creative documents.



DESKPACK 1 $34.95

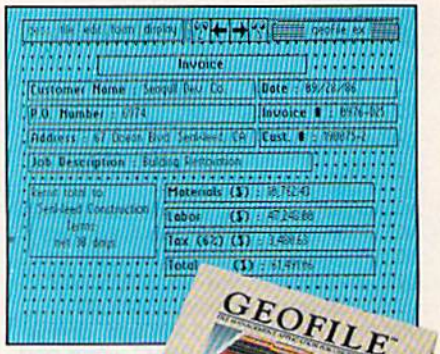
Four GEOS-compatible applications: Graphics Grabber for importing art from Print Shop,™ Newsroom™ and Print Master™ graphics; Calendar; Icon Editor and Black Jack Dealer.





GEOCALC $49.95

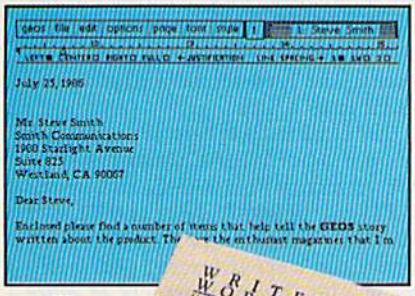
The GEOS-compatible, number-crunching spreadsheet for tracking and analyzing numerical data. Create your own formulas, perform calculations for anything from simple geometry to "what if" cost projections.

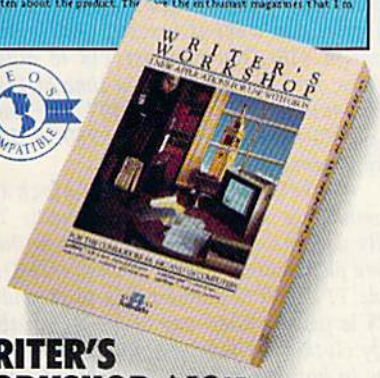


GEOFILE $49.95

The GEOS-compatible database manager that sorts, edits and prioritizes whatever data you feed it. You fill out the "input form," specify your command, and geoFile takes it from there.

MMODORES ARE TOYS, WITH THESE.



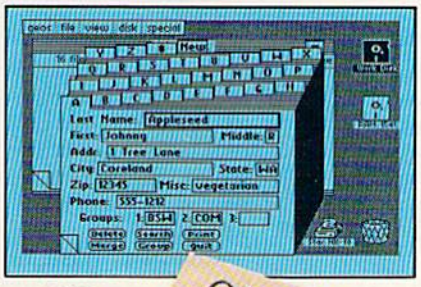


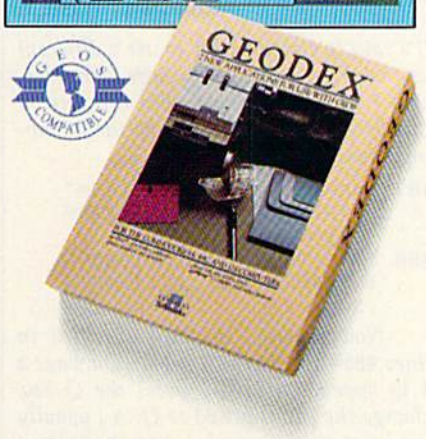
WRITER'S WORKSHOP $49.95

All the GEOS-compatible tools a writer needs, including geoWrite 2.0 with headers, footers and features to justify, center, search and replace text. Includes a Text Grabber (for converting text from programs like Paper Clip™), geoMerge and LaserWriter printing capability.

GEODEX $39.95

The GEOS-compatible directory that allows you to create lists by name, address, phone number, etc. Includes geoMerge to customize form letters and invitations.





GEOPRINT CABLE $39.95

The six-foot cable that speeds up printing because it's parallel—not serial. Connects easily to Commodores with fewer wires and no interface box.

To order call 1-800-443-0100 ext. 234
(California residents add 7% sales tax.)
$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore and Commodore C64 are trademarks of Commodore Electronics, Ltd. GEOS, geoWrite, geoPaint, geoCalc, geoDex, geoMerge, geoFile, Deskpack 1, Fontpack 1, Writer's Workshop and Berkeley Softworks are tradenames of Berkeley Softworks. Print Shop, Newsroom, Print Master, and Paper Clip are tradenames of companies other than Berkeley Softworks.

Sooner or later, you're going to discover that there's more to Commodores than fun and games.

You're going to discover power.

Not the kind of power that blasts aliens out of the galaxy. But the kind that whips through boatloads of data in seconds. The kind that crunches numbers and drafts documents like child's play.

The kind you find in GEOS.

Every GEOS application can take your Commodore from "mastering the universe" to a university master's degree, with all kinds of advanced capabilities that function at hyper-speeds you never imagined possible.

So if you're tired of toying with technology, try playing around with GEOS. Once you feel its power, you'll know that for anyone who still thinks Commodores are toys, the game's over.

Berkeley Softworks

The brightest minds are working at Berkeley.

Do you have a question or a problem? Have you discovered something that could help other Commodore users? We want to hear from you. Write to Gazette Feedback, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403. We regret that due to the volume of mail received, we cannot respond individually to programming questions.

Where Does Machine Language Come From?

I don't understand how programs are put into a SYS location. Is it possible to place a BASIC program in a SYS location?

James Glover

SYS is a BASIC statement which transfers control to a machine language (ML) program. It's similar to RUN in that it takes you out of immediate mode (where the computer is waiting for you to type something) and starts up a program. You can also use SYS from within a BASIC program. You can SYS to an ML routine, but you can't SYS to a BASIC program.

The BASIC interpreter knows where a BASIC program begins because it needs to keep track of the starting and ending locations of the program for editing and for disk and tape storage. An ML program, however, can begin at any memory location. Therefore, you must specify the address of the first byte of the machine language subroutine when you do a SYS. Many ML programs for the 64 begin at the unused memory block located at 49152. The line ***SYS 49152*** *begins execution of these programs.*

ML programs can be stored in memory in a variety of ways. Short programs are often POKEd into memory from BASIC. When you see a program with a block of DATA statements, those numbers are sometimes a machine language program. You can also load ML programs from tape or disk. Usually, you have to add a comma and a 1 after the LOAD command—for example, ***LOAD"program name",8,1****. Still other machine language routines are already in memory when you turn on the computer. These built-in routines make up the operating system and the BASIC language. (BASIC is itself a machine language program.)*

The built-in routines can be turned off and the memory there made available, but the memory can't be used for BASIC programs. To obtain the extra memory, you must turn off BASIC. If you then loaded a BASIC program into that area, you'd never be able to run it because RUN is a BASIC command and BASIC has been disabled.

MLX For Professional Typists

At work I am a data entry operator. I like the idea of the 64 MLX Keypad, where you use certain letters on the keyboard to stand for numbers, but the layout "MLX" uses is different than what I am used to at work. How can I change the MLX keypad?

Charles E. Waste II

It's easy to change MLX to use a different keypad. First, make sure you're using Version 1.1 of MLX (line 10 has the version number). Then add or change the following lines:

```
487 A=A-13*(A$=S$)-14*(A$="
    7")-15*(A$="8")-16*(A$=
    "9")
488 IF A THEN A$=MID$("ABCD
    123E456F0789",A,1):GOTO
     540
```

Now reassign the keys specified in lines 485–487. For instance, if you want a 1 to appear when you press the Q key, change the J in line 485 to Q. A J usually produces the numeral 1 (see the keypad chart in the MLX article elsewhere in this issue).

Jiffies And Clocks

I was trying to figure out how to use TI$ as a timer to keep up with how long it takes my child to do math problems. Can this clock be reset to zero (or any number) without turning off the 64? Also, I thought that all numeric variables were used without a dollar sign ($) on the variable name. Since TI$ holds a number, why isn't it displayed as TI?

Evidently TIME is another clock, because when I type PRINT TIME, it displays a progressively larger number. After some experimentation, I figured that this number advances approximately 60 times per second. Can you please explain about this also?

Randy Sibley

The variables TI$ and TI (or TIME$ and TIME—only the first two letters of the variable name are significant) tell you the value in the jiffy clock, *but they put the time in slightly different formats. As you've discovered, the clock ticks 60 times a second. The 1/60-second unit of time is referred to as a* jiffy.

The clock is set to zero whenever you turn on a 64 or other Commodore computer. To reset it from BASIC, include the line ***TI$ = "000000"****. Note that* ***TI = 0*** *won't work. You can read the value of TI, but you can't set it (except indirectly through TI$). You may set TI$ to other values; for example, to set a time of 1:35 you would use* ***TI$="013500"****. The time uses a 24-hour format: After 23:59:59, TI$ wraps around to 00:00:00.*

There's only one system clock in Commodore computers. The variable TI tells you the total number of jiffies that have passed since the clock was reset. Divide TI by 60 to convert this to seconds. TI$ is just another way of looking at the jiffy clock—it changes the number of jiffies to hours, minutes, and seconds. One reason to make TI$ a string variable (with a $ after the variable name) is that it prints the time in a consistent format with leading zeros. Because TI$ is a string, you can use the MID$ function to extract the hours, minutes, and seconds. To convert a string to a numeric value, use the VAL function. For example, ***PRINT VAL(TI$)*** *would print 120 for a time of 000120.*

The following short program for the 64 uses TI$ and TI to test reaction time. It illustrates how to use the jiffy clock to time an event (waiting for a keypress, in this case).

```
10 X=INT(RND(1)*5000)+1000:
   REM RANDOM NUMBER 1000-5
   999
20 FOR Y=1TOX:NEXT:REM DELA
   Y LOOP
30 IF PEEK(198)>0 THEN PRIN
   T"TOO EARLY":POKE198,0:G
   OTO 10
40 PRINT"PRESS A KEY"
50 TI$="000000"
60 GET A$:IF A$="" THEN 60
70 PRINT TI/60;"SECONDS":GO
   TO 10
```

Numbers With CHAR

I'm trying to write a simulation program for the Commodore 128. One problem I have run into is that I can't get variables to print in the graphics mode. Here is part of my program:

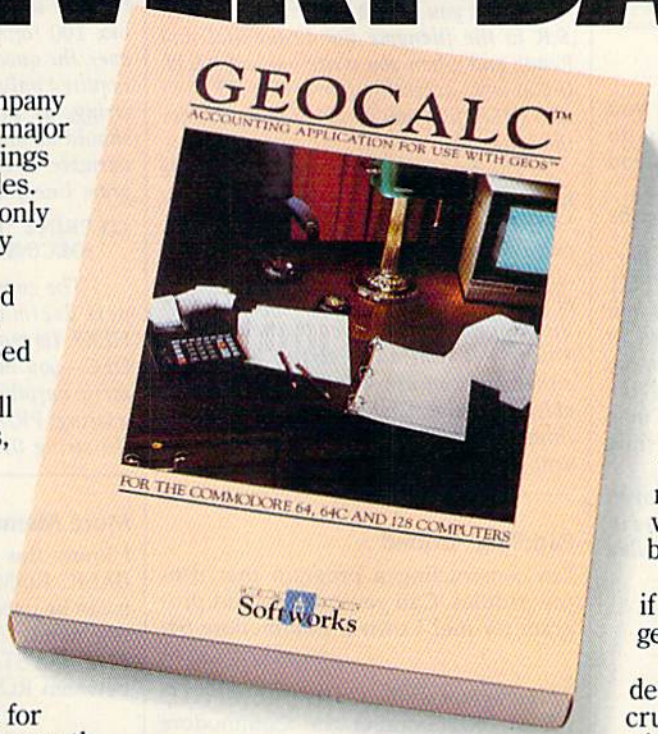
WE'RE SELLING THE ONE THING WE COUNT ON EVERY DAY.

Running a software company is no picnic. We have to do major calculations every day. Things like payables and receivables. Taxes. Budgets. And lord only knows how many quarterly cost projections.

That's why we developed geoCalc. The spreadsheet program for GEOS-equipped Commodores.

You see, we not only sell software for Commodores, we actually use them in our own offices. So when Lee needs to project inventory costs, or Brian wants to figure employee bonuses, the first thing they do is load up geoCalc.

The very same spreadsheet you can use at home for figuring finances, mastering math mysteries or personal production predictions.



	A	B	C	D
4	Operating Expense			
5		January	February	March
6	Raw Materials	11000	11750	10750
7	Manufacturing	15000	14500	14150
8	Rent	4000	4000	4000
9	Labor	20000	20000	21000
10	Utilities	3000	3150	3100
11	Transportation	8000	7800	8000
12	Overseas Shipping	4000	4500	4250
13				
14	Total	65000	65700	65450
15				
16	Grand Total		196150	

With geoCalc, you get 112 columns and 256 rows to fill with all kinds of text and numbers. And formulas that range from simple addition to arctangents and cosines that could knock any physicist cold.

There are investment functions. Averages. Even a random number generator. And writing your own formulas is as easy as, umm... one, two, three.

With mouse in hand, you can zip all over the huge spreadsheet, solving "what if" questions with a few quick clicks. Questions like, "If Sheila takes the waitress job, how much can we expect our taxes to increase?" Or "How much faster will the Chevy go if we rip out the muffler and the back seat?"

No matter what the problem, if it has to do with numbers, geoCalc can solve it. Fast.

So if you notice a need to decimate digits, consider crunching them with geoCalc. We rely on it for our business. In fact, we couldn't manage without it.

To order call 1-800-443-0100 ext. 234

geoCalc $49.95

(California residents add 6.5% sales tax.)

$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

Commodore and Commodore C64 are trademarks of Commodore Electronics, Ltd. GEOS, geoCalc and Berkeley Softworks are tradenames of Berkeley Softworks.

GEOCALC

Berkeley Softworks

The brightest minds are working at Berkeley.

```
10 GRAPHIC 1,1
15 H=180
20 CHAR 1,5,5,"HEADING: ";H
```

The variable in line 20 doesn't print out.

Rick Grossenbacher

BASIC 7.0's CHAR statement won't print the value of a numeric variable; it will display only strings (or the contents of string variables). Fortunately, BASIC provides a simple way to generate a string containing the digits of a numeric variable—the STR$ function. For example, A$=STR$(123) produces the same result as A$="123", and STR$(H) will produce the string equivalent of the value of the numeric variable H. There's just one other consideration: Unlike PRINT, CHAR will display only a single string, so you can't use print separators like the semicolon you have in line 20 above. Instead, you must use the + operator to concatenate (join) any substrings into a single string. Here's a workable version of line 20 for your program fragment:

```
20 CHAR 1,5,5,"HEADING: "+STR$(H)
```

Filing Away Information

When you are in a program and you want to save some text, how do you do it? And after you save it, how do you load and list it?

Ashton C. Hobbs

A sequential file would suit your purposes. If you're familiar with the INPUT and PRINT commands, the INPUT# and PRINT# commands won't be hard to learn. INPUT reads information from the keyboard, and PRINT writes it to the screen. INPUT# and PRINT# act in a similar way, but they read and write from files you've opened.

To create a sequential file, you open it for writing, write to it, and then close it. The program below creates a file called NAMES on disk.

```
10 OPEN 1,8,2,"0:NAMES,S,W"
20 PRINT"TYPE FOUR NAMES"
30 INPUT A$:PRINT#1,A$
40 INPUT B$:PRINT#1,B$
50 INPUT C$:PRINT#1,C$
60 INPUT D$:PRINT#1,D$
70 CLOSE 1
```

If you now look at the disk directory, you'll see that there's a file called NAMES and it's a SEQ type file. You can turn off the computer, and the information will still be in the disk file. The program below reads and prints the names from the file.

```
10 OPEN 3,8,5,"NAMES,S,R"
20 FOR X=1 TO 4
30 INPUT#3,Z$:PRINT Z$
40 NEXT X
50 CLOSE 3
```

In the first program, the INPUT took information from the keyboard, but PRINT# sent it to the file. In the second, the INPUT# read the file and then PRINTed the information to the screen.

The OPEN statement at the beginning of each program must be followed by three numbers (numeric variables would work as well) and a filename (or a string variable). The commas must separate the three numbers, which indicate the logical file number, the device number, and the secondary address.

The logical file number identifies which file you're using and it must follow the PRINT# or INPUT# statement when you access the file. It can be any number in the range 1–127. The device number is 8 for single disk drives. Additional drives are usually numbered 9–11; printers are usually device 4; cassette drives are device 1. The secondary address means different things to different devices. For disk drives, it tells the drive which channel to use. When you're using sequential disk files, the secondary address may be any number from 2 to 14, but if you ever have more than one file open simultaneously, you must be careful that each file has a unique secondary address.

When you read a sequential file, add ,S,R to the filename (for Sequential and Read), and when you write one, add ,S,W. If you were accessing a program (PRG) or user (USR) file, you'd subsitute P *or* U *for the letter* S.

The first information to go into a file is the first to come out when you read it. Note that the variable names A$, B$, C$, and D$ were used in writing the file, but all four names came out as Z$. The name of the variable is not saved to the file, only the information contained by the variable. You're not limited to string variables, either. You can use strings, numeric variables, formulas, CHR$ codes. Almost anything you can PRINT to the screen can be sent to a disk file.

Paddling Around

I'm constructing a program that uses the paddles. Can you print a short program for me? I own a Commodore 64.

Terry Gavit

This program is adapted from COMPUTE! Books' Programming the Commodore 64. *The variables X and Y return the values of the two paddles and FB returns the value of the two fire buttons (each paddle normally has its own). The paddles should be plugged into port 2.*

```
10 POKE 56333,127
20 POKE 56322,192
30 POKE 56320,128
40 X=PEEK(54297)
50 Y=PEEK(54298):FB=PEEK(56
   320) AND 12:POKE 56322,2
   55:POKE 56333,129
70 PRINT X,Y,FB
80 GOTO 10
```

Run this program and turn the paddles. The program prints three numbers. The first two are the values of the two paddles. The third number contains the paddle fire button information. A 12 means that neither button is pressed, a 4 or an 8 means one of the buttons is pressed, and a 0 means that both are pressed.

Decoding DEC

I can't get DEC to work on my computer. The following line returns an ILLEGAL QUANTITY error message:

```
115 PRINT "DECIMAL NUMBER IS"
    ;DEC("N$")
```

Any suggestions?

Mark Todd

There is a particular syntax for the DEC function, available in the versions of BASIC in the Commodore 128, Plus/4, and 16. DEC generates the decimal numeric value of a character string which presumably holds a hexadecimal number. (You'll get an error message if the string contains any characters other than the numbers 0–9 or the letters A–F.) For example, PRINT DEC("100") returns 256, because that's the decimal equivalent of hex 100 (often written as $0100). However, the quotes inside the parentheses are required only when you are using a literal string, *as the "100" above. The quotes should be omitted when you use a string variable, so the proper version of the program line you mentioned would be:*

```
115 PRINT "DECIMAL NUMBER IS"
    ;DEC(N$)
```

The complementary function to convert decimal values to hex strings is HEX$. Its requirements are the opposite of DEC—you must supply a number or numeric variable, and the function generates a string: PRINT HEX$(256) would display the string 0100.

More Memory For The 64

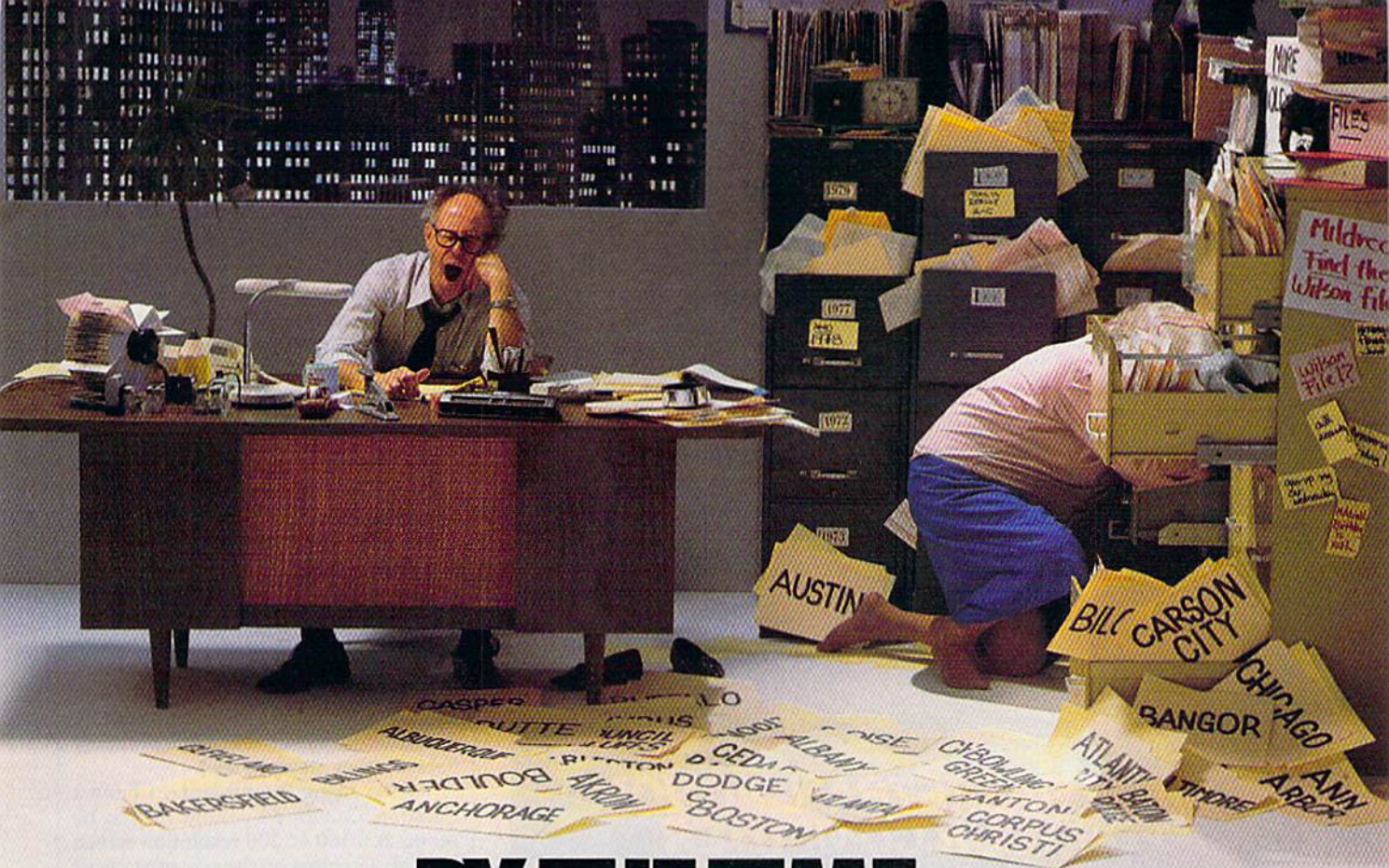
I know the 64 has 8K of RAM under BASIC ROM at 40960–49151 and that it can be used as long as BASIC isn't being used. Which machine language LDA and STA do I need to use to switch between ROM and RAM?

David P. Ballin

I have recently taught myself machine language out of a book. I'd like to write a program entirely in ML, with no BASIC at all, but I need about 50K of free RAM. The book says I can free a memory block from $0801 to $CFFF with LDA #$36: STA $01. However, when I do this, the computer crashes. Either something is wrong with my computer or I can't take advantage of this free RAM in direct mode. How can I program this memory?

Jeff Martin

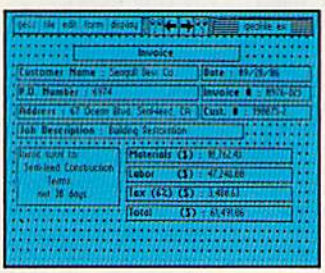
Bit 0 of location 1 determines whether the computer sees memory at $A000–$BFFF as BASIC ROM or as the RAM under-



BY THE TIME SHE GETS TO "PHOENIX," HE'LL BE SLEEPING.

Having thousands of facts is one thing. Finding the ones you need is another. Which is why you should consider buying geoFile. The easy-to-use database manager for GEOS-equipped Commodores.

Whether they're receivables or recipes, once you have geoFile, you can fly through facts in seconds, clicking and picking the ones you want, just the way you want them.



It's as simple as filling out a form.

The geoFile "form" organizes all kinds of information. Like names, numbers, rates of objects' acceleration when dropped from two-story buildings—you name it. As much as you can fit on a printed page.

Once your data is in, the real fun begins.

You want names of bus drivers? From Arizona? Under five foot six? Between the ages of 33 and 35? With incomes of $22,396 or more? Who sneezed in June?

Just click your mouse and watch geoFile go to work. Searching. Sorting. Comparing and listing the data alphabetically. Or numerically. Or in whatever priority your form specifies.

You can put the data into form letters and lists with geoMerge. Or into math functions, with geoCalc. Or if you really want to get fancy, you can display your information graphically with geoChart.

And geoFile does it all in seconds.

Now, with all that in mind, what are you going to do—spend a few bucks on geoFile?

Or spend all night wishing that you had?

To order call 1-800-443-0100 ext. 234

geoFile $49.95

(California residents add 6.5% sales tax.)

$2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

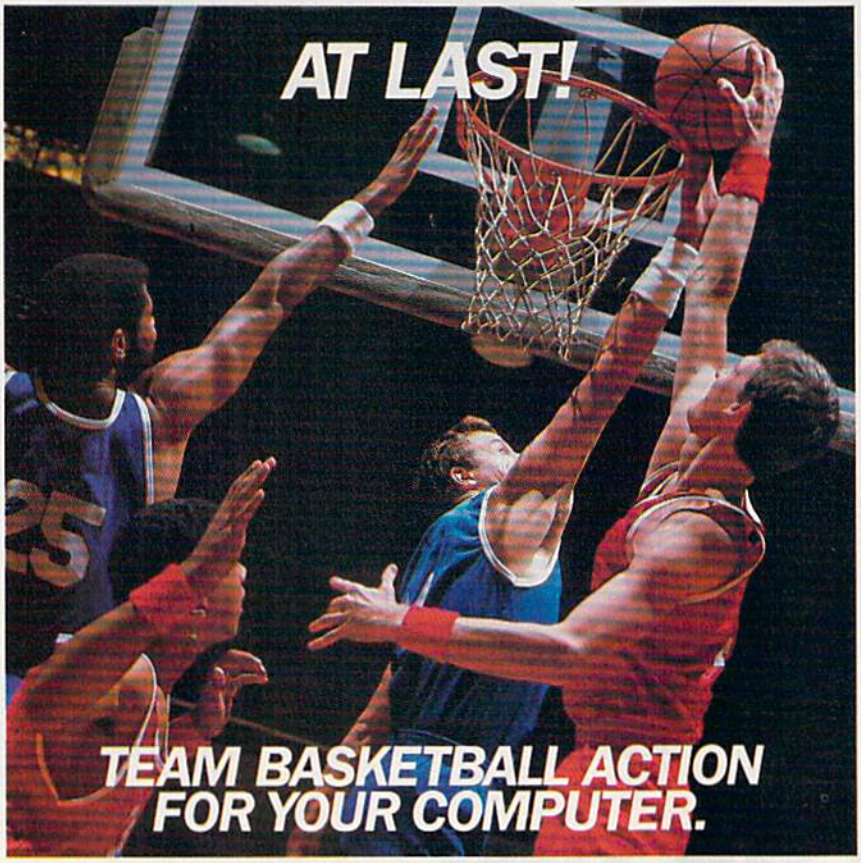
Commodore and Commodore C64 are trademarks of Commodore Electronics, Ltd. GEOS, geoFile and Berkeley Softworks are tradenames of Berkeley Softworks.

GEOFILE

GEOS COMPATIBLE

Berkeley Softworks

The brightest minds are working at Berkeley.



Two-On-Two Basketball Action

One-on-one is OK for a little practice, but real basketball is a **team** sport. To be really good at it, you need **all** the skills – passing, dribbling, shooting, stealing and rebounding. That's what it takes to win a championship. That's what **GBA Championship Basketball™: Two-on-Two™** delivers.

From the roar of the crowd to the swish of the net, from slam dunks to three-point shots, it's all here – fast and competitive.

Not only is there **team** action, but you can even compete in a 4-division, 23-team league – all the way to the playoffs and the GBA Championship game!

When you're ready to jump into the big leagues of computer basketball, start with the game that begins where the others leave off – **GBA Championship Basketball: Two-on-Two.**

Commodore Amiga screen shown.

"...the best arcade basketball game I've seen. If you liked *One on One*, you'll *love* this..." – Randy Chase, *Guide to Computer Living*

GAMESTAR

Distributed and marketed exclusively by Activision. Gamestar is a trademark of Activision Inc. Commodore 64, 128 and Amiga are trademarks of Commodore Electronics, Limited. Apple is a trademark of Apple Computer, Inc. Atari ST is a trademark of Atari Corporation. IBM PC and PCjr are trademarks of International Business Machines Corporation. Tandy is a trademark of Tandy Corporation. © 1986 Activision. All rights reserved.

For Commodore 64, 128 and Amiga, Apple IIe, IIc, and IIGS, Atari ST, IBM PC, PCjr, Tandy 1000 and 100% compatibles.

neath. If the bit is on, ROM is enabled. If it's off, the memory is available. On the 64, store a $06 into location $01 to turn off the BASIC ROM and store a $07 to turn it back on.

When you make this memory available, you pay a price—you lose BASIC ROM. BASIC is gone, which is fine if you're writing a program entirely in ML and if the program doesn't call any built-in ROM routines from that area. But you must store a $07 to location 1 before you end the ML program and return to direct mode. BASIC is in charge of monitoring your keypresses, printing them to the screen, and interpreting commands (like RUN or SYS) that you might type. If you've switched out BASIC, direct mode will seem to be locked up.

Hi-Res 80 Columns

I recently downloaded a program from a telecommunications service. It shows that bitmapped graphics are possible on the 128's 80-column screen, something Commodore never revealed (probably because they never knew).

After using the program, I have a question. Can the 80-column display be set up as a 160 × 200 resolution screen with all 16 colors on the screen at once?

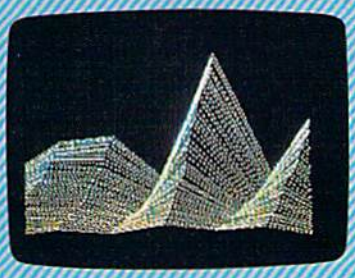
Lyle C. Seplowitz

The chip that controls the 80-column display, the 8563, was designed by Commodore specifically for the 128, so it's certain that they did know about the 8563's hi-res bitmapped mode. It's true that the 128 System Guide *doesn't make any mention of it, but that's because BASIC and the operating system don't support bitmapped mode, so Commodore considers it an advanced topic. If you're interested in reading more about it, both* Mapping the Commodore 128 *(from COMPUTE! Books) and Commodore's own* Commodore 128 Programmer's Reference Guide *(published by Bantam Books) have sections that explain how the 80-column chip works.*

An explanation of all the 80-column chip's capabilities would require a complete article. To briefly answer your question about multiple colors, yes it it possible to display all 16 colors on the screen at once. In bitmapped mode, each pixel is represented by a single bit in the area of 80-column screen memory known as the bitmap. *Each bitmap bit controls whether the corresponding pixel will take the foreground color or the background color. The foreground and background colors can be specified in two ways. In the first, an area of screen memory can be set aside as* attribute memory. *Each byte in attribute memory holds foreground and background color values for a corresponding 8-by-8-pixel character cell in the display, analogous to color memory for the 40-column screen. Using this system,*

GET UP TO 200 FUN-FILLED PROGRAMS EACH YEAR—

when you subscribe now to COMPUTE!'s Gazette



Subscribe to COMPUTE!'s Gazette today through this special introductory money-saving offer, and you'll be getting a lot more than just another computer magazine. That's because each issue of COMPUTE!'s Gazette comes complete with up to 20 all-new, action-packed programs.

Subscribe now and you can depend on a steady supply of high quality, fun-filled programs for your Commodore computer—programs like Disk Editor, Mini-Filer, Arcade Baseball, Budget Planner, Sound Designer, *SpeedScript*, and hundreds of other educational, home finance and game programs the entire family can use all year long.

The superb programs you'll find in each issue are worth much, much more than the low subscription price.

And there's more to COMPUTE!'s Gazette than just exciting new programs. Month after month, the superb articles in COMPUTE!'s Gazette deliver the latest inside word on everything from languages to interfaces...from programming to disk drives.

Whether you're a novice or an experienced user, COMPUTE!'s Gazette is the magazine for you. So subscribe today. Return the enclosed card or call 1-800-247-5470 (in Iowa, 1-800-532-1272).

Do it now.

ACT NOW AND SAVE!

The Gazette Talks To Miami Vice's Jan Hammer
COMPUTE!'s GAZETTE
FOR COMMODORE PERSONAL COMPUTER USERS
Computers And MIDI
Vampyre Hunter
Arcade Baseball
Super Synth
Make great sounds on your 64—the easy way.

COMPUTE!™ Publications, Inc. abc

One of the ABC Publishing Companies

If attached order card is missing, write: COMPUTE!'s Gazette P.O. Box 10955, Des Moines, IA 50950

each character-cell area can have independent foreground and background colors, and all 16 available colors can be displayed simultaneously.

The problem with this system is the amount of memory it requires. The size of the 80-column screen bitmapped display is programmable, but the default size is 640 pixels horizontally by 200 vertically, a total of 128,000 pixels. Since each byte consists of eight bits, 16,000 bytes of memory are needed for the bitmap. The 8563 chip has its own private bank of memory not shared with the rest of the system, but that bank contains only 16K (16,384 bytes). Thus, there's not enough memory remaining after the standard 16,000 bitmap is set up to provide the 2000 bytes required for the corresponding attribute memory area. The alternate color system, used in most of the bitmapped graphics examples we have seen so far, eliminates the need for attribute memory, but at the cost of restricting you to only two different colors for the display. That is, when attribute memory is eliminated, the foreground and background colors are common for all pixels in the display.

There are three ways to add additional colors to the hi-res screen. The first is to shrink the size of the bitmap, displaying only about 112,000 pixels. You can then allocate the free memory as attribute memory and display any one of 16 foreground colors in each 8-by-8-pixel area in the smaller 640-by-176-pixel display. The second method is to simulate bitmapped mode in text mode by redefining the 512 available character patterns. In other words, use custom characters. The third is to replace the 16K of 80-column screen memory with 64K, which requires desoldering the memory chips and soldering new ones in place. Needless to say, this would void your warranty and is not a project for novices.

Big Variables, Small Variables

I am working on a program that requires a lot of memory to load and a lot of memory to store variables. According to the *Programmer's Reference Guide*, five bytes of memory are used to store floating-point variables, while only two are required for an integer.

I wrote a simple program to print the current available RAM and then did some testing. A floating-point array of 100 values takes up 512 bytes, adhering closely to the 5-bytes rule. Dimensioning an array of 100 integer variables took up 209 bytes, close to 2 bytes per integer variable.

However, when I tried assigning a value to several different (scalar) variables, each required seven bytes, whether it was floating-point or integer. Why do individual variables take up the same amount of room?

John R. Bendixsen

Scalar non-array variables such as A, B, X$, A1%, or RA$ use seven bytes each because if every variable occupies a fixed amount of memory, searches can be faster. When you reference a variable, the system has to scan through memory to find it. If variables start at every seventh byte, the computer doesn't have to slow down to figure out where the next variable is.

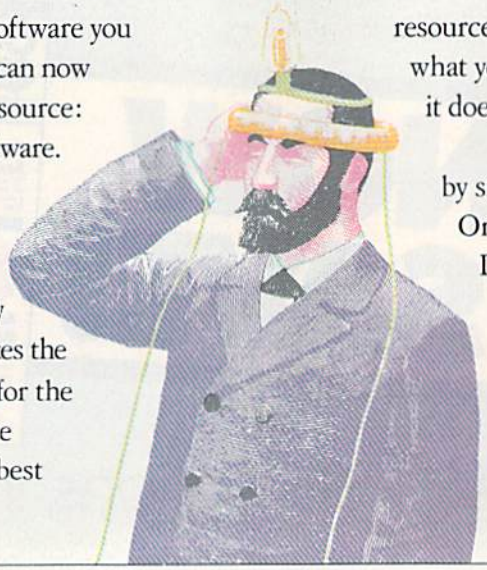
Within the seven bytes, the first two indicate the variable name. A value of 128 may or may not be added to the first or second letter, depending on what type of variable it is. Floating-point variables use all five of the remaining bytes, integer variables use two of the five bytes, and string variables use three (one for the length of the string and two for a pointer to the address where the string is stored).

Arrays are handled a little differently. To find the value of A(52), BASIC first searches for the beginning of the A( ) array and then calculates the location of element 52. There's no need to look through the previous 52 values of the array. Floating-point arrays need five bytes per member, while integer arrays use less memory, only two bytes. If you consider that the statements DIM A(100) or DIM B%(100) create arrays of 101 elements, numbered 0–100 (not 1–100), then the first DIM should use 505 bytes, the second 202. The name of the array and a pointer to the beginning of the storage area adds an overhead of seven bytes, to give you a total of 512 and 209, the sizes you reported.

If you feel like a lost soul when it comes to music software, get the bible.

Almost every bit of music software you could possibly want or need can now be found in a unique single source: Coda, the bible of music software.

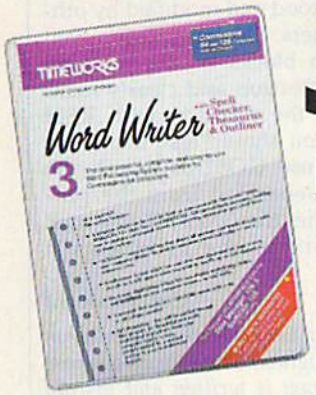
Detailing over 500 items which range from software to accessories to books, Coda is a remarkably user-friendly catalog that takes the confusion out of searching for the right music software. It's the computer-using musician's best resource today. In fact, if you can't find what you need in Coda, chances are it doesn't exist.



Order Coda today for only $4.00, by simply calling the number below. Or write to: Wenger Corp., 555 Park Drive, Dept. C2, Owatonna, MN 55060. It's not only inspirational, it's divine guidance.

Coda. 1-800-843-1337.
All major credit cards accepted.
Or call collect 1-507-451-1951.

THE LEADING C64 WORD PROCESSOR JUST GOT BETTER!



No Brag. Just Fact. WORD WRITER 3 has more features, more power, and is easier-to-use than any other C64 word processor.

***And now the facts!* We've added:**

- **An 85,000-Word Spell Checker** – plus, unlimited sub-dictionaries.
- **An Integrated Thesaurus** with over 60,000 synonyms and alternatives.
- **An Integrated Outline Processor** that quickly organizes notes, facts, and ideas into a convenient outline format.
- **An 80-Column Print Preview Mode**
- **Highlighting:** Prints out your text incorporating underlining, **boldface**, *italics*, superscript, subscript, and more.
- **Headers and Footers**
- **Automatic Program Set-Up:** Configures WORD WRITER 3 to your choice of printer codes, screen colors, and more.
- **SwiftKeys*** access commands quickly, using a minimum of keystrokes.
- *. . . and much, much more!*

You Get Free, Ongoing Technical Support

Rest assured. When you show your support by buying Timeworks software, we never stop showing ours. That's why our twelve Customer Support Technicians have been giving our T.L.C. (Technical Loving Care) *for over four years*. And, all our programs have a Money Back Guarantee**

TIMEWORKS®

More power for your dollar

Timeworks, Inc. 444 Lake Cook Road
Deerfield, Illinois 60015 312-948-9200

** Details on every Timeworks package.
* Registered trademarks of Commodore Electronics, Ltd., Timeworks, Inc., Berkeley Softworks, Inc.
© 1983 Timeworks, Inc. All Rights Reserved.

Word Writer 3 interfaces with Timeworks' other C64 programs for a complete Productivity System:

- **DATA MANAGER 2** with **Report Writer**
  A highly flexible filing and recordkeeping system that stores, retrieves, sorts, evaluates, and updates large amounts of information. Includes: Report Writing, Graphics, Statistics, and Label Making capabilities.
- **SWIFTCALC** with **Sideways**
  A powerful, surprisingly easy-to-use electronic spreadsheet for home and business use. Plus, with Sideways, prints all your columns on one, continuous sheet – sideways!
- **PARTNER 64**
  A cartridge-based product with eight instantly accessible desktop accessories. PARTNER operates *"concurrently"* with your other C64 software programs.

Available for Commodore 64/128* Computers (64K, 40 Column)

Suggested Retail List Prices:

WORD WRITER 3	**$49.95**
DATA MANAGER 2	**$39.95**
SWIFTCALC	**$39.95**
PARTNER 64	**$59.95**

Now at your favorite dealer, or contact Timeworks today.

To Order Call
1-800-535-9497

These Programs Are GEOS* Compatible

"21 SECOND BACKUP" (VERSION 4-1) ™

The SOLUTION

TO DISK DUPLICATION FOR COMMODORE-64

FAST — Duplicates diskettes in **21-seconds***.

SIMPLE — One keystroke provides complete backup.

RELIABLE — Error free reproduction from originals.

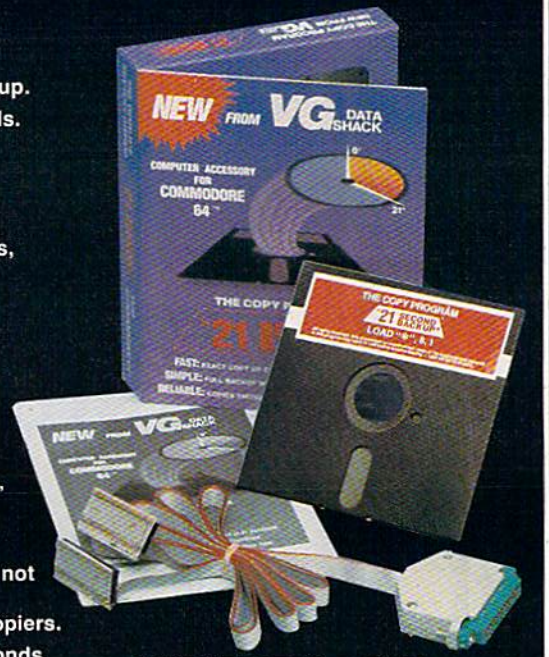
DUPLICATION PROCESS INCLUDES:

- ★ Automatic formatting and disk analysis.
- ★ Duplication of errors, track and sector ID's, gaps, checksums, sync bytes, address marks, clock bits, and densities.
- ★ Track to track synchronization.
- ★ Half track and abnormal track duplication.

ADDITIONAL FEATURES

- Easy to follow menu driven software.
- Snap on hardware installation.
- Program designed for use with 1 or 2 1541 drives.
- Hardware is transparent when "21 second backup" is not in use.
- "Verify option" to ensure transfer of proper data.
- User provided with exact duplicate of original (will not break protections).
- "21 seconds backup" will strengthen parameter copiers.

*Heavily protected disks will take maximum 45-seconds



NEW UPDATES — CALL

ANOTHER GREAT PRODUCT

SUPER FAST FILE BACKUP UTILITY

FEATURES INCLUDE:

- ★ Same hardware as "21 second backup"
- ★ Uses 1 or 2 1541 drives
- ★ Copy files; copies 36 blocks (9k) per-second
- ★ Modifies directories and adds seperators
- ★ Renames files, disk names, and ID's
- ★ Swaps, deletes, and transfers files
- ★ Disk analysis; verifies entire diskette
- ★ Validates files with accuracy
- ★ Formats entire diskette in 10-seconds
- ★ Split screen directory viewing

PLUS **15 SECOND BACKUP**

Duplicates entire non-protected diskettes in 15-seconds

21-second backup (with hardware)	$39.99
Super fast file backup utility (with hardware)	$39.99
21-second backup + super fast file backup utility	$55.99
21-second backup (disk only)	$19.99
Super fast file backup utility (disk only)	$19.99

Add $7.00 shipping, handling, and insurance
All prices in U.S. currency.
Quebec residents add 9% sales tax.

Always same day shipping

ORDER TODAY
Send — money order to:

VG DATA SHACK

5625 Grande Allée Blvd,
Loc (5), Brossard, Québec,
Canada, J4Z 3G3

Phone — (514) 445-9663,
(514) 445-9598, (514) 656-8952

WE ACCEPT

MasterCard VISA

UnREMarkable Programs

I am a Commodore 64 owner who does much programming on my own. It appears to me that many of the programs published in the GAZETTE have bad structure. It is important to have good structure so that the programs may be easily understood and modified by other programmers. In my opinion you should group blocks of the program that do one function and clearly mark and describe the function with REM statements. You should also use fewer GOTOs and use GOSUBs to call the subroutines separated from the program. Why does the GAZETTE use such bad structure in the programs it publishes?

Corey Luecht

There are many ways to judge the value of a computer program. One way is to ignore how the program is written and instead observe how it performs. A program that works well is, from one perspective, a well-written program. For instance, if you use a word processor, the internal structure of the program is unimportant, indeed it's unknown—instead, you want the word processor to help you do what you need to get done.

Many of the programs published in COMPUTE!'s Gazette are written by the readers of the magazine—and a lot of programmers write unstructured programs. When we select a program to be published, we look for many things: utility, entertainment value, ease of use, visual appeal, creativity, and programming technique. Although we appreciate the fact that many of our readers learn programming techniques from the programs we publish, we simply don't have the time to rewrite programs in the magazine to conform to our ideas of elegance.

For example, one factor that works against structured programs is size. A liberally commented program could easily be three times as large as a more compact, uncommented program. Such a program would take up too much space in the magazine. Also, in many cases, a structured program runs more slowly. What looks like an inelegant subroutine might be optimized for speed.

Although it is possible to write structured programs in BASIC, the language does not encourage it. In some cases, BASIC makes you pay a penalty for structure. REM statements take up both space and time. In a compiled language, comments are automatically deleted from the running program.

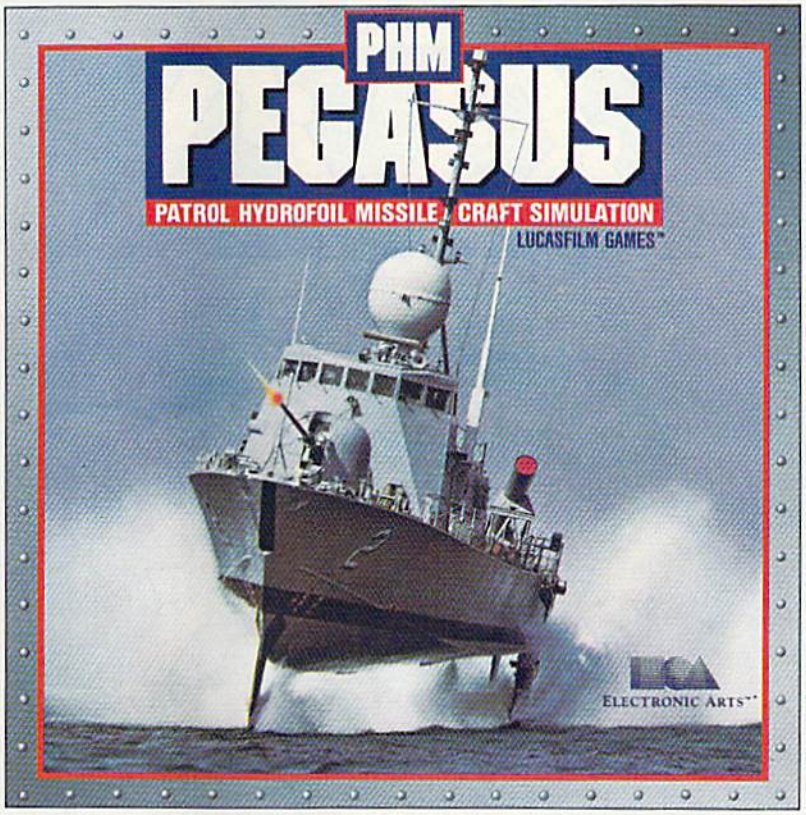
Many programmers think of BASIC as a language that is best used to quickly write utilities and test ideas. Some of these programmers see structured programming techniques as a hindrance.

(Top Guns don't always fly on air . . . Some fly on water)

Warship of the Jet Age

Red Alert!! Red Alert!!
0800 hours: Terrorists attack U.S. naval base off Sicily . . . Intelligence reports enemy missile corvettes fleeing toward Libya . . . Additional enemy patrol craft seen in area . . . Seek out and destroy . . . Take no prisoners . . .

The Need for Speed . . .
Your search helicopter spots the Soviet-built Nanuchka II missile corvette charging across the "Line of Death." Foilborne and closing in at 50 knots, you've got him in your sights. Guns blazing, you lock-on and launch a Harpoon guided missile. Through the water spouts of his near misses, you see him explode into flames. Another mission accomplished.



™ & © 1987 L.F.L.

The Patrol Hydrofoil Missilecraft.

So agile, enemy radar mistakes it for low-flying aircraft.

So fast, enemy forces have only minutes to react.

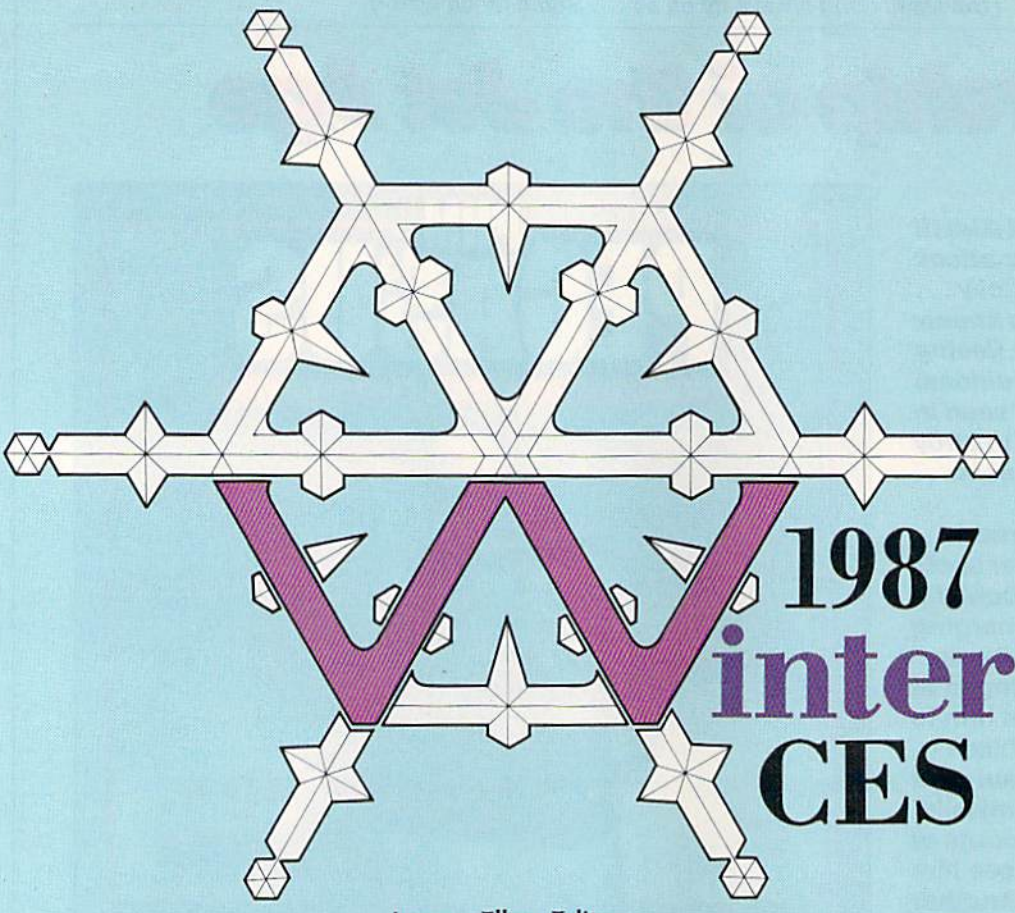
So deadly, there is no second chance.

A Commanding Simulation . . .

- Authentic speed and handling characteristics of three different NATO ally hydrofoils: U.S., Italian, and Israeli.
- Advanced instrumentation and weapons systems include: 76 mm water-cooled naval cannon, Exocet, Harpoon and Gabriel guided missiles, rapid blooming defensive chaff, radar indicator and damage control sensors.
- Full control of search helicopters and convoy ships.
- 8 real-life missions in today's danger zones like the Persian Gulf, the Eastern Mediterranean and the Gulf of Sidra.
- Time compression speeds action to 128x normal.
- Comprehensive operations manual includes mission briefings and enemy vessel spotter cards.
- Technical consultant: Boeing Marine Systems.

How to order: **Visit your retailer, or call 800-245-4525 for direct VISA or Mastercard orders (In CA call 800-562-1112).** The direct price is $34.95 for the Commodore version and $39.95 for the Apple II version. To buy by mail, send check or money order to Electronic Arts Direct Sales, P.O. Box 7530, San Mateo, CA 94403. Add $3 for shipping and handling ($5 Canadian). Please allow 4 weeks for delivery. Screen shots represent C64 version. Others may vary. Commodore and C64 are registered trademarks of Commodore Electronics Limited. Apple II is a registered trademark of Apple Computer, Inc. Lucasfilm Games, PHM Pegasus, and all elements of the game fantasy:™ & © 1987 Lucasfilm Ltd. (L.F.L.). All rights reserved. Electronic Arts, authorized user.

ELECTRONIC ARTS™



Lance Elko, Editor

The Consumer Electronics Show Report

A rare snowfall covered Las Vegas in early January as tens of thousands of people arrived for the Winter Consumer Electronics Show. With it came a flurry of exciting new hardware and software products—plus plenty of good news for Commodore owners.

Commodore 64 and 128 owners have a lot to smile about. For the past year, the new-generation 16-bit machines—the Amiga, Atari ST, Macintosh and Apple IIGS—have captured many of the headlines in the home computer market. While many 64 and 128 owners may have wondered if their machines were soon to follow the VIC-20's path to obsolescence, the good news is that these machines continue to sell *very* well.

Nowhere was the continuing health of the 64 and 128 more evident than at the Winter Consumer Electronics Show (CES), held in Las Vegas in early January. Looking more like an agitated beehive than a showcase for state-of-the-art electronics technology, the floor of the Las Vegas Convention Center teemed with more than 100,000 people. While the majority of CES product displays were in audio and video, the personal computer hardware and software element was significant.

Not surprisingly, Commodore and Atari had the largest and most popular booths in the computer section. Both companies announced a number of interesting new hardware products. They also shared their booth space with a variety of third-party hardware and software developers in support of their respective products.

Commodore showed two versions of an IBM PC-compatible for the American market that have been available for some time in Europe and Canada. (See "Commodore Goes Cloning In The U.S." following this article.) While Commodore's introduction of its PC compatibles was merely a formality—the debut of these machines in the U.S. market was announced months ago—Atari surprised everyone with its announcement of two low-priced PC compatibles and a $1,500 laser printer.

While Atari pulled a rabbit out of a hat, Commodore had a quiet surprise of its own. Hidden on the second floor of the booth, away from the public eye, were Commodore's two new Amigas: the 500—a

new low-cost but powerful version for the mass market—and the 2000—an expandable and multifaceted machine that converts easily into a PC compatible. (See "The New Amiga Family" following this article.)

The Commodore 128's new twin—the 128D.

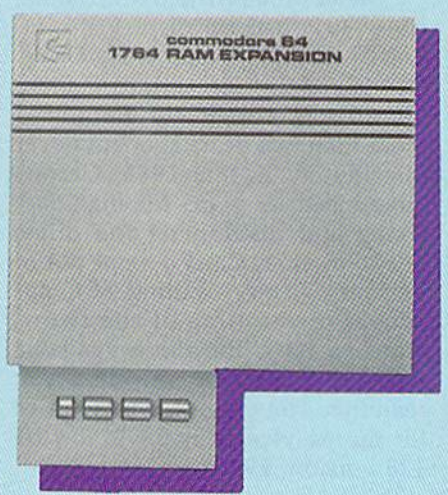
Teaching Old Dogs New Tricks

Things are looking up for Commodore. On the rebound with three consecutive profitable quarters—after a dismal and shaky six-consecutive-quarter loss—the company appears to be on steady ground. The cost-cutting measures implemented in 1985 and early 1986 are surely one reason for Commodore's newfound state of health. But another key factor in its resurgence is the sustained sales of the 128 and 64/64C, which still surprises even some Commodore staff. According to Nigel Shepherd, general manager of Commodore North America, the 128 sold about one million units in 12 months, while Commodore 64/64C sales were strong throughout the year. In 128 and 64 sales, Shepherd noted that toward the end of 1986, they "virtually sold everything to the walls. We virtually sold out of each machine."

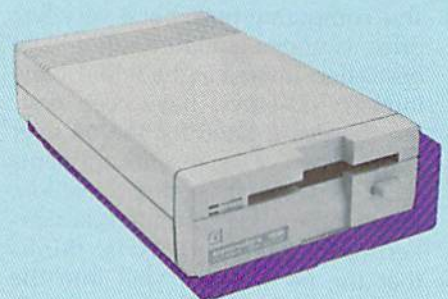
In light of an optimistic forecast, Commodore announced a number of new 128 and 64 hardware products at CES. Shoppers who decide on the 128 will now have to choose between configurations. The new 128D, essentially the same computer as its twin, offers a new package design: a detachable keyboard (with a 24-inch cord) and a computer console that houses a 1571 disk drive and doubles as a monitor stand. According to Shepherd, this version of the 128 has been in Europe since 1985: "What happened was that the original design of that machine did not pass the FCC and required a substantial redesign. So...we continued to market it in Europe while we slowly but surely redesigned the machine for North America. That was the reason for its going to Europe but not here." He added that with a single power supply, the 128D "eliminates the unsightly wiring and the need for additional power cords." This machine should be available by May at a suggested retail price of around $550.

To make existing 128 and 64 systems more powerful, Commodore introduced a couple of new hardware products. The 1581 disk drive, a unit considerably smaller than the 1571 or 1541, supports 3½-inch disks. Designed to work with the 128 or 64 (also with the Plus/4 or 16), the 1581 is considerably faster than its predecessors (three times faster than the 1541), and it has a storage capacity of 808K. Also, 3½-inch disks—housed in a hard shell—suffer less disk damage. Accidental bending—not uncommon with the 5¼-inch floppy—is eliminated. Suggested retail price for the 1581 is $399.

Commodore 64 owners who want more memory should be pleased with the new 1764 RAM Expansion module, which plugs into the expansion port to add 256K of memory. Packaged with the module are two disks: a DOS program that lets you access the extra RAM as a RAM disk, and a *GEOS* RAM disk for use with all *GEOS* applications. The suggested retail price for the module and disks is $129.



Commodore's new RAM expander adds 256K of memory to the 64.



The Commodore 1581 Disk Drive offers faster data transfer and 808K storage capacity.

If you need a lot more memory for your 128 or 64, it's available. Two companies sharing space in Commodore's booth, JCT and Xetec, were showing hard drives. JCT (P.O. Box 286, Grants Pass, OR 97526) offers three versions of its hard drive: a 10-meg ($795), a 5-meg ($695), and a 3.7-meg ($595). These work with any machine that uses the Commodore serial bus (128, 64, Plus/4, 16, or VIC, for example). Data transfer on the JCT drives is 1.7–2 times faster than on the 1541, but a parallel option (cable and cartridge are an additional $50) for speeds 10–20 times faster is available. JCT also noted that a dual hard drive is planned and should be available this spring.

Xetec (2804 Arnold Rd., Salina, KS 67401) had on display the Lt. Kernal 20-Meg Hard Disk Drive. Developed by Fiscal Information, this drive was originally announced more than two years ago, but never distributed. In late 1985, Cardco announced its plans for manufacturing and distributing the drive, but soon after, Cardco went out of business. Xetec, awaiting FCC approval at the time of the show, plans to have the drive available through dealers by the time you read this. The suggested retail price for the 64 version is $899; for the 128 version, $949.

The Old War Horse

The Commodore 64, with its tremendous software base and impressive computing power at a very low price, is understandably still a huge bestseller. Interestingly, while some industry observers have been ringing the death knell for the 64 over the past two years, recent comments have gone in the other direction. Bing Gordon, vice president of marketing for Electronic Arts, thinks that the 64 will sell well into the 1990s. Nigel Shepherd agrees: "I think if somebody had said to me—maybe in '85—what future do you see for the 64, I would have been very aggressive and said 'At least through to '87.' But I think today you're talking certainly past 1990.

"So, it's not going to die....We finally said, 'Why should we try to supercede this product when there's still demand out there?' You're probably going to see some enhancements along the way with the 64. We're going to continue to look at that machine to see how we can make it more attractive and more competitive."

Better Than Ever

The massive software base is another reason that the 64 and 128 continue to sell well. While there were fewer packages announced at this CES than were introduced at the 1984 and 1985 shows, the overall quality of the new products is higher than ever. (For a complete report, see "Fine-Tuning The Software Market," elsewhere in this issue.)

When you compare the quality and prices of this year's products with those of 1983–85—when the market was inundated with Commodore software—it's apparent that the consumer is the beneficiary. Competition has weeded out a number of companies with substandard products, while some of the major players have consolidated product lines or merged with other quality publishers. The result is software that includes to date the best in 64/128 graphics, animation, sound, and utility. It remains to be seen whether developers can take the eight-bit Commodores any further, but, as it appears now, all bets are on.

Elsewhere In Electronics

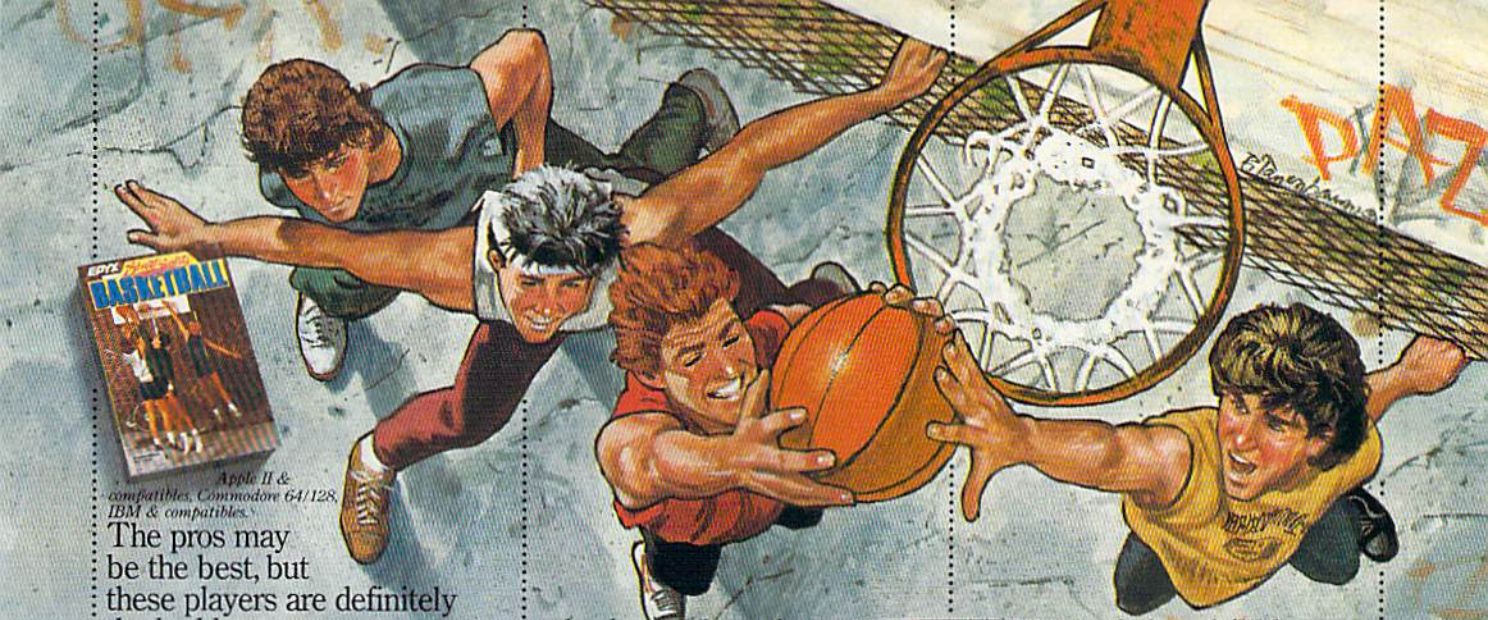
The home computer market is a significant part of CES, but the majority of products at the show are in the audio and video arena. The bulk of CES floor space is comprised of the latest in stereo components, VCRs, TVs, satellite dishes, CD players, video cameras, telephones, electronic keyboards and drum machines, calculators, and more. Familiar names abound—Sony, Pioneer, Casio, RCA, Maxell, Toshiba, 3M, and GE, to name a few. And there are hundreds of smaller companies who make accessories or support products for many of these hi-tech players.

One trend in consumer electronics evident from this year's CES is the continued strong movement toward *digital* electronics. At the show, digital TVs/monitors appeared to have remarkably crystal-clear resolution, and new digital VCRs featured rock-solid special effects. But much of the new-product attention was focused on Digital Audio Tape (DAT). Essentially a tape equivalent of the compact disc (CD), the technology and production capabilities for this medium are here, but the product itself is not on the market. DAT—about half the size of the standard cassette—is being sold in Japan and, according to many sources, will be in the U.S. later this year, perhaps as early as summer.

Like the CD, DAT offers vastly improved sound quality. But that's not all. Because data can be packed more densely, a lot more music can be stored—two hours per side. Many tape manufacturers have DAT ready but are hesitant to act until the hardware is available. But DAT deck manufacturers—Sony, Kenwood, and Onkyo, to name a few—are abstaining from production start up for a couple of reasons.

First, many audio manufacturers believe that DAT could seriously undercut the booming CD market, which has accelerated in the past year to the point where demand has greatly exceeded supply. Some would prefer to wait to release DAT players until the CD boom subsides. Second, there's the home taping controversy—piracy. With a DAT deck, the owner of a CD player could easily make a sterling copy. Thus, there is pressure on Congress from some in the recording industry to impose a 35 percent tariff on DAT players not equipped with a microchip-controlled device designed to prevent copying.

While some expect DAT to be here this summer, others have noted that, because of the formidable opposition, it would be unrealistic to expect it at all in 1987.



Apple II & compatibles, Commodore 64/128, IBM & compatibles.

The pros may be the best, but these players are definitely the baddest.

Presenting the first in our Street Sports™ Series, *Basketball.*

You'll shoot hoops in dingy alleys. Playgrounds. Parking lots. Occasionally, even the suburbs (have fun dribbling on the lawn).

You'll pick your three-person team from the 10 toughest players in the neighborhood. There's hot shooters and slow dribblers. Team players and show-offs. There's guys who can shoot the eye out of a needle at 20 feet. And guys who couldn't sink one if they were sitting on the backboard. Pass on the run. Get that big man on the inside.

Sometimes it's best to take a pass.

TASTE THE THRILL OF VICTORY AND THE AGONY OF THE STREET.

Let Joey pop 'em from the corners. This is real street strategy. Take a hook shot. A tip-in. Bounce the ball off the chain-link fence, then go for the basket. Or power through for a slam dunk.

But don't dribble in the oil slick. And for heavens sake, watch out for windows.

It's not like any basketball game you've ever played on a computer. But just like every basketball game you've ever played for real.

ANOTHER HIT.

It's bottom of the ninth. Batter's 0 and 2. The score—well, maybe it's time to take up bridge.

Introducing *Street Sports Baseball.*

Okay. The pitcher winds, throws, and, crack! It's a long fly ball to, to, yes, it's going—bang. Right in his glove.

Notice that somebody just stole second base. Funny, it was here a minute ago.

It's not going to be as simple as you thought to be the first on your block.

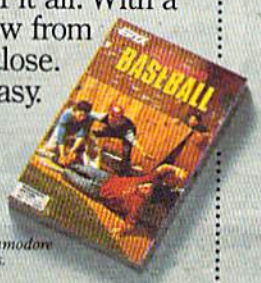
After all, you'll have to cope with makeshift diamonds, bases made from spare tires and trashcans, bushes, rocks, even squealing cars.

Not to mention 16 neighborhood players. Each with their own personalities and skills in pitching, hitting and fielding. With the right combination, you could be the champs. With the wrong combination, the chumps.

You'll pick the place. The team. The positions. The strategy. And then, you'll be right in the middle of it all. With a split-screen view from above and up close.

It won't be easy.

But it's right up your alley.



EPYX

Apple II & compatibles, Commodore 64/128, IBM & Compatibles.

Commodore Goes Cloning In The U.S.

Selby Bateman, Features Editor

Commodore's PC10-2 is a $1,199 IBM PC compatible with two disk drives and 640K of RAM. The PC10-1 (not shown) is priced at $999 and contains one disk drive and 512K of RAM (expandable to 640K).

To many loyal 64 and 128 owners, the idea may smack of heresy: Commodore introducing an IBM clone?

That's right. The same people bringing you the very popular 64 and 128 and the technologically stunning Amiga have jumped on the burgeoning IBM-compatible bandwagon in the United States. At the January Consumer Electronics Show (CES), Commodore introduced two IBM PC compatibles, the $999 PC10-1 and the $1,199 PC10-2.

At the same show, there were no fewer than a half-dozen other computer manufacturers demonstrating their own clones, including such companies as Amstrad, Victor, Blue Chip/ Hyundai, and Franklin. Even Atari showed two versions of an IBM compatible, priced aggressively at $499 and $699. Other manufacturers, such as Tandy, Leading Edge, Compaq, and Epson, are also marketing PC compatibles.

Those not familiar with the clone invasion that's been taking place over the last year may wonder what all the excitement is about. And those who are familiar with the IBM PC may wonder why anyone would bring to market a new computer whose technology has been virtually unchanged since 1981.

The answer to both questions lies in the unparalleled success of the IBM PC in the business market over the past six years, as well as the more recent capability of many companies to sell PC compatibles for substantially less than has IBM. The PC, with its MS-DOS operating system and a couple of disk drives, can cost as much as $1,500 from IBM. Clone-makers are selling the same machine (sometimes with better features) for as little as $600.

At those prices, the PC compatible becomes affordable not only by more small businesses, but by individual consumers as well. And as thousands of potential new buyers begin to move toward the clones, more and more companies are trying to get a share of this new market.

But Commodore is no newcomer to the IBM-clone environment. The two PCs Commodore exhibited at CES have been successfully marketed in almost identical form in Europe and Canada for some time. And there's every reason to believe the company may do quite well at selling the two versions of their PC compatible here in the states, although they'll face fierce competition for shelf space among dealers and for visibility among consumers already inundated with a bewildering array of information on other compatibles.

Commodore's pricing, relatively high when compared to that of some of the more recent clones, may also be a major factor in its 1987 PC sales. Undoubtedly, the company will come under pressure to lower the announced $999 and $1,199 prices. But Commodore, which will be selling its PC compatibles through dealers rather than mass market chains, wants to provide dealer margins of 35 percent to help promote wide distribution.

"We haven't gone for the jugular on price," says Nigel Shepherd, Commodore's North American general manager. "It's a very competitive business. What we've gone for with the PC is a price/feature combination that gives the dealer a margin [of profit]. And we think it will give us acceptable market share and acceptable profits."

The $999 PC10-1 comes with one built-in 360K double-sided, double-density disk drive, and 512K of RAM, which can be expanded to 640K. The $1,199 PC10-2 includes two built-in drives and 640K of RAM. Both units have room for installation of a half-height or full-height hard disk.

Both computers include the

tcp DOES MAIL ORDER RIGHT

Peter Sander President
TUSSEY COMPUTER PRODUCTS

GREAT PRICES

"We buy in volume and pass the savings onto you!!!"

FAST SERVICE

"Over 90% of all items ordered are in stock and shipped within 24 hours."

FEDERAL EXPRESS

FEDERAL EXPRESS

"Software orders over $50.00 will be shipped Federal Express. You only pay TCP's standard shipping charge of $4.00 per order. This offer also valid on peripherals and accessories under 8 pounds. Orders arriving before 11:00 am our time will be shipped out same day."

BEST SELECTION

"We stock hundreds and hundreds of products for commodore computers! Every week we add even more. We're the first to get in all the hot new software releases. Just another reason why we should be your first call!!"

"I'm proud we deliver all of these. Response from tens of thousands of satisfied customers can only mean we're doing mail order right!"

EDUCATIONAL & CORPORATE ACCOUNTS:

We offer a full line of services catering to you. Including; quick turn-around, personal service, and the flexibility to serve your organizations needs. Credit Approval in 24 hrs for any organization with a good D&B rating.

To reach our Educational and Corporate Sales Department directly, Call 1-800-533-1131 or Inside PA Call 814-234-2236

OTHER CUSTOMERS PLEASE CALL THE NUMBER LISTED BELOW

FREE

COMMODORE 1660 MODEM COUPON

with the purchase of any of these packages ordered MAR 29th or before*

Commodore 128 computer 1571 Disk Drive	$478.00
Commodore 128 computer 1571 Disk Drive 1902A Monitor	$737.00
Commodore 64C computer 1541 Disk Drive	$349.95
Commodore 64C computer 1541 Disk Drive 1802C Monitor	$549.95

*Coupon is redeemable by mail for (1) 1660 Modem - Call for more information.

CALL TOLL FREE 1-800-468-9044 Inside PA Call 814-234-2236

tcp DOES MAIL ORDER RIGHT

OPEN: 9am-8pm Mon-Fri, 10am-5pm Sat EAST COAST TIME
NEW HRS STARTING MAR 01: 9am-9pm M-Thur, 9am-6pm Fri, 10am-6pm Sat, Noon-6pm Sun

INFORMATION AND PA ORDERS 814-234-2236

GAME GALLERY
Educational Software too! All Games stocked for quick ship!!!

NEW TITLES
IN STOCK EVERYDAY!! If you don't see what you want please call!!!

MISC GAMES
Hobbitt	$CALL
Sargon III	$37.95
Murder by the Dozen	$24.95

ACCESS
Beach Head	$24.95
Beach Head 2	$29.95
Leader Board	$29.95
Leader Board Tourn. Disk	$16.95
Tenth Frame	$27.95

ACCOLADE
Dam Busters	$22.95
Fight Night	$22.95
Hard Ball	$22.95
Law of the West	$22.95
PSI 5 trading co	$22.95
Spy vs Spy	$12.49

ACTIONSOFT
Call for price on all Actionsoft titles

ACTIVISION
Acazar	$19.95
Borrowed Time	$19.95
Comp. Firewks Celebrat'n	$19.95
Countdown to shutdown	$19.95
Fast Tracks Slot Car Const	$19.95
Gamemaker Scifi Library	$15.95
Gamemaker Sports Library	$15.95
Garry Kitchen's Gamemakr	$24.95
GBA Basketball 2 on 2	$24.95
Ghostbusters	$24.95
Great Amer RR	$24.95
Hacker	$19.95
Hacker II	$24.95
I am the 64	$21.95
I am the 128	$24.95
Little Computer People	$24.95
Master Of Lamps	$19.95
Mindshadow	$19.95
On Court Tennis	$21.95
Pitfall II: Lost Caverns	$19.95
Shanghai	$26.95
Space Shuttle	$19.95
Star Rank Boxing	$21.95

ARTWORX
International Hockey	$18.95

AVALON HILL
Dr Ruth	$21.95
Gulfstrike	$22.95
Spitfire 40	$24.95
Superbowl Sunday	$26.95
Team Disk for SS	$16.95

BRODERBUND
Champshp Lode Runner	$24.95
Karateka	$19.95
Lode Runner	$24.95
Music Shop	$29.95

BLUE CHIP
Baron	$24.95
Millionaire	$24.95
Tycoon	$24.95

COMMODORE
Sky Travel	$27.95

DAVIDSON & ASSOR
now in stock! Call for price on titles

DATA EAST
Commando	$24.95
Karate Champ	$26.95
Kung Fu master	$26.95

DATA SOFT
Pole Position	$15.95

ELECTRONIC ARTS
Adventure Constr	$27.95
America's Cup	$24.95
Amnesia	$29.95
Archon	$12.95
Archon 2	$27.95
Artic Fox	$24.95
Autoduel	$37.95
Bard's Tale	$32.95
Bard's Tale II	$29.95
Battlefront	$29.95
Carriers at War	$37.95
Chessmaster 2000	$26.95
Cut and Paste	$12.95
Europe Ablaze	$37.95
Hard Hat Mack	$13.95
Heart of Africa	$12.95
LordS of Conquest	$24.95
Mail Order Monsters	$12.95
Marble Madness	$27.95
Moebius	$29.95
Movie Maker	$27.95
M.U.L.E.	$12.95
Murder Party	$25.95
Music Construction Set	$12.95
Ogre	$29.95
One on One	$12.95
Pinball Construction Set	$12.95
Quizam	$20.95
Racing Destruction Set	$12.95
Reach for the Stars	$32.95
Realm of Impossible	$12.95
Robot Rascals	$29.95
Seven Cities of Gold	$12.95
Sky Fox	$24.95
Software Golden Oldies	$16.95
Starfeet I	$32.95
Super Bolder Dash	$12.95
Tim Leary's Mind mirror	$24.95
Touchdown Football	$22.95
Ultima I	$29.95
Ultima III	$37.95
Ultima IV	$45.95

EPYX
Championship Wrestling	$27.95
Movie Monster	$22.95
Summer Games	$26.95
Summer Games II	$26.95
Super Cycle	$29.95
Temple Trilogy	$29.95
Winter Games	$27.95
World Games	$29.95
World's Greatest Baseball	$24.95
World's Greatest Football	$28.95
World Karate Cha	$22.95

Call for prices on other EPYX products !

FIREBIRD
Elite	$22.95
Pawn	$27.95

INFOCOM
Balley Hoo	$29.95
Cut Throats	$22.95
Deadline	$25.95
Enchanter	$25.95
Hitchhiker's Guide	$22.95
Infidel	$29.95
Leather Goddesses	$24.95
Moon Mist	$24.95
Planetfall	$25.95
Sorcerer	$29.95
Spellbreaker	$29.95
Suspect	$29.95
Trinity	$32.95
Wishbringer	$25.95
Witness	$25.95
Zork I	$22.95
Zork II	$26.95
Zork III	$26.95

INVISICLUE BOOKS FOR ANY INFOCOM GAME $6.95

LANCE HAFNER
Final Four Basketball	$29.95
Basketball, the Pro Game	$29.95

MICROLEAGUE
Microleague Baseball	$27.95
Microleague general mgr	$27.95
Microleague 1985 teams	$15.95

MICROPROSE
Acrojet	$24.95
Crusade in Europe	$27.95
Decision in the Desert	$27.95
F-15 Strike Eagle	$21.95
Gunship	
Conflict in Vietnam	
Hellcat Ace	$21.95
Kennedy Approach	$24.95
NATO Commander	$24.95
Silent Service	$24.95
Solo Flight	$24.95
Spitfire Ace	$21.95
Top Gunmen	

MINDSCAPE
Bank Street Music Writer	$27.95
Bank Street Storybook	$27.95
Bop-n-Wrestle	$21.95
Castle Clobber	$18.95
Halley Project	$27.95
Indiana Jones	$22.95
Indoor Sports	$22.95
Infiltrator	$21.95
Quake minus one	$17.95
Shadowfire	$17.95
Star Trek Promethian Adv	$29.95
Perfect Score SAT prep	$49.95
The Lords of Midnight	$17.95

Call for prices on other MINDSCAPE products!

RADARSOFT
Floyd the Droid	$19.95
Maps USA	$34.95
Maps Europe	$34.95
World Maps	$34.95

SIERRA
Championship Boxing	$17.95

SIMON & SHUSTER
Paper Airplane const.	$CALL
JK Lasser's Income Tax	$39.95
Kermit's Story Maker	$19.95
NY Times Crossword Puzzle Vol. 1 or 2	$14.95
Spy Hunter	$31.95
Star Trek-Kobayashi alt	$29.95
Typing Tutor III	$29.95

SPECTRUM HOLOBYTE
Gato	$CALL

SPRINGBOARD
Early Games	$26.95
Easy As	$29.95
Piece of Cake Math	$26.95

SUBLOGIC
Flight Simulator II	$32.95
Football	$37.95
FS II Scenery disk	$15.95
Jet	$29.95
Night Mission Pinball	$CALL
Pure Stat Baseball	$37.95

WEEKLY READER STICKY BEAR SOFTWARE
now in stock! Call for price on titles!

Random House, Spinnaker, and SSI products in stock!!! Call for Price!

C-64 BUSINESS AND PRODUCTIVITY

C-64 DATABASES
Bank Street Filer	$34.95
Consultant	$39.95
Data Manager	$19.95
Fleet Filer	$29.95
Pocket Filer 64	$24.00
Profile 64	$36.95

C-64 INTEGRATED PKGS
Homepak	$39.95
Trio	$CALL
Vizastar 8k	$79.95

C-64 SPREADSHEETS
Calkit	$39.95
Pocket Planner 64	$CALL
Practicalc(d) or (t)	$CALL
PS. Programble Sprdsht	$19.95
Swiftcalc 64 w/sideways	$39.95
Sidways	$19.95
Vizastar 64	$79.95

C-64 WORD PROCESSORS
Bank Street Writer	$CALL
Bank Street Speller	$34.95
Cut & Paste(EOA)	$12.95
Fleet System II	$CALL
Font Master II	$34.95
Kid Pro Quo	$32.95
Paperclip	$37.95
Paperclip w/spellpack	$49.95
Pocket Writer	$CALL
Pocket Writer Dictionary	$19.95
Spellpro 64	$32.95
Trio	$CALL
Wordpro 3+/64	$14.95
Wordpro 64	$36.95
Wordpro GTS	$CALL
Word Writer 64 w/speller	$34.95

FINANCIAL & ACCT.
Cashbox	$36.95
Cont. Home Acct.	$46.95
Financial Time Machine	$29.95
Softsync Pers. Acct.	$32.95
Timeworks Electr. Checkbk	$19.95
Timeworks General Ledger, A/R,A/P, Payroll, Invtory ea	$40.95
Timeworks Money Mgr	$19.95

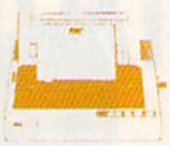
GRAPHICS
CADPIC	$32.95
Clip Art I	$19.95
Clip Art II	$CALL
Graphics Library I, II, or III	$16.95
Graphics Scrapbk 1 or 2	$17.95
Newsroom	$34.95
Picasso's Revenge w/pen	$CALL
Print Shop	$25.95
Print Shop Companion	$24.95

MISC. HARDWARE
Estes pwr supply for C-64	$54.95
Naverone 3 Slot expander	$27.95

UTILITIES
GT4	$22.95
Copy II 64	$24.00
C Power	$69.95
CSM 1541 align	$34.95
Fast Load	$24.95
Mach 5	$24.95
Merlin 64	$34.95
Pal 64	$32.95
Power 64	$32.95
Toolbox 64	$59.95
Quest Stat manager	$34.95
Vorpal fast loader	$CALL

FREE LIGHT PEN w/purchase of Picasso's Revenge Painting Program $42.95

PRINTERS



star MICRONICS INC.

NX-10 PRICE DROP TO **$207.95**

NP-10	$184.95
NX-10C	$CALL
NX-15	$349.00
NL-10C	$CALL
POWERTYPE	$229.00

18cps, daisywheel

BROTHER 1509
180 CPS DOT MATRIX PRINTER, 15" CARRIAGE, FRICTION AND TRACTOR FEED, 45 CPS NLQ MODE, & 3K BUFFER. USES EPSON FX PRINT CODES.

$379 OUR PRICE

Epson Printers 1 yr warranty
EPSON 1

LX-80	$229.00
HOMEWRITER 10	$CALL
FX-85e	$359.00
FX-286e	$CALL
RX-100	$279.00
DX-10	$CALL
HS-80 INKJET	$CALL

XETEC
Fontmaster 128...	$CALL
Fontmaster 64	$34.95

SEIKOSHA
2 YR WARRANTY

SP-1000VC $164.95

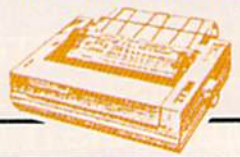
JUKI
6100P	$CALL
5510P includes color kit	$CALL

Printer Interfaces

MW-350 w/10k buffer	$CALL
XETEC Supergraphix	$CALL
XETEC Supergraphix Jr	$46.95

PANASONIC
2 YR WARRANTY

1080i	$199.95
1090i, 1092i	$CALL
3131 Daisywheel	$CALL



tcp TUSSEY COMPUTER PRODUCTS P.O. BOX 1006 STATE COLLEGE, PA 16804

tcp DOES MAIL ORDER RIGHT

CALL TOLL FREE 1-800-468-9044

MONITORS

COMPOSITE COLOR

Call for Composite Color Monitors

MONOCHROME

ZENITH 1220 12" flat amber	$94.00
ZENITH 1230 green	$94.00
GOLDSTAR 12" med resolution amber or green	$79.95
MAGNAVOX 8562 2 yr warranty monochrome mode	$259.95
THOMPSON 36512VC mono mode separated video	$249.95

MODEMS

SHAREDATA	$36.95
VOLKS 6480 300/1200 baud	$CALL
WESTRIDGE	$49.95
MESSENGER	$42.95
1660	$CALL
MITEY MO	459.95
VIP TERMINAL	$34.95
COMPUSERVE STR KIT	$19.95
PLAYNET STARTER KIT	$14.95

CMS

General Acct System

includes: • General Ledger • Accts Receivable • Billing Statements • Accts Payable • Check Writing • Job Costing • Payroll

Pkg. Price for all Modules:

C128 version	$124.95
C64 version	$119.95

TCP leads the way!!!

128 AND 64 HARD DRIVES FROM JCT

Plugs into the disk drive port just like the 1571 to maximize compatibility. 5 year warranty on the mechanical portion of the Hard Drive. 1 Year warranty on electronics. Immediate replacement within 1 year.

MODELS AVAILABLE:

JCT1005, 5mb ..... $CALL
JCT1010, 10mb ..... $CALL
(less than $829.00!!! call for best price)

PRINTER PACKAGES

ALL PRINTERS INTERFACE WITH C-64 or C128

Star

NX-10 & XETEC SUPERGRAPHIX.... $269.95
NX-10 & XETEC Supergraphix Jr. $249.95

PANASONIC

1080i and Xetec Supergraphix $259.95
1080i and Xetec Supergraphix jr . $244.95

SEIKOSHA

Call for price on new SP-1200 packages

OKIDATA

Okimate 10 Color Printer and Plug 'n' Print Module $159.95

EPSON $CALL FOR LOWEST PRICE

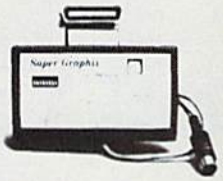
LX-86 & INTERFACE..
DX-10 DAISYWHEEL &
XETEC Supergraphix Jr..... $219.95

BROTHER

1509 & XETEC SUPERGRAPHIX..... $419.00

XETEC

SUPER GRAPHIX
Interface w/8k buffer down loadable fonts
$$$LOWEST PRICE
SUPER GRAPHIX JR printer interface $46.95



Abacus

NOW IN STOCK!! Call for price on all books and software titles

Broderbund

Broderbund Print Shop	$25.95
Print Shop Companion	$22.95
Graphics Library I, II, or III	$16.95
120 sheet color paper refill 40 each red, blue, gold	$8.95
Certificate Maker	$32.95
Thinking Cap	$32.95
Certificate Library	$24.95
Toy Shop	$42.95
Holiday Pack	$16.95

DISKS

per box of 10

BONUS DISKS	
SS/DD	$6.45
DS/DD	$6.95
NASHUA DISKS	
SS/DD	$8.95
DS/DD	$9.45
TUSSEY DISKS	
SS/DD	$8.45
DS/DD	$8.95

Call for Price on Verbatim and Maxell Disks!!

Digital Solutions Inc.

Pocket Writer 2	$42.95
Pocket Filer 2	$42.95
Pocket Planner 2	$42.95
Digital Superpak	$74.95
Dictionary	$12.95

Unison World

Printmaster	$29.95
Art Gallery	$CALL

SOLUTION UNLIMITED

Icon Factory	$29.95
Billboard Maker	$29.95

MODEM MANIA

1670 MODEM $99.95
1200 Baud, w/Software
1660 MODEM $42.95
300 Baud, w/Software

Software orders over $50.00 will be shipped FEDERAL EXPRESS (yes, even with *these* prices)

You only pay TCP's standard shipping charge of $4.00 per order. This offer also valid on peripherals and accessories under 8 pounds. Orders arriving before 11:00 AM our time will be shipped out same day.*

FEDERAL EXPRESS

Computerized order entry, processing and status allow TCP to serve you faster and better!

COMMODORE 128= SOFTWARE

For 128 in 128 or CPM modes

WORD PROCESSORS

FLEET SYSTEM II w/spell	$47.95
FLEET SYSTEM III w/spell & thesaurus	$CALL
FLEET SYSTEM 4	$56.95
JANE	$32.95
PAPERCLIP II	$CALL
PERFECT WRITER	$CALL
POCKET WRTER 128	$CALL
SUPERSCRIPT 128	$59.95
TERM PAPER WRITER	$34.95
VIZAWRITE 128	$CALL
WORDPRO 128	$59.95
WORDPRO 128S w/spell	$CALL
W'DWRITER 128 w/spell	$49.95

SPREADSHEETS

EPYX MULTIPLAN	$39.95
PERFECT CALC	$CALL
POCKET PLANNER 128	$CALL
SWIFTCALC 128 w/sdways	$49.95

DATA BASES

CONSULTANT	$39.95
DATE MANAGER 128	$CALL
FLEET FILER	$29.95
PERFECT FILER	$CALL
POCKET FILER 128	$CALL
PROFILE 128	$59.95
SUPERBASE 128	$CALL

MISC. 128 SOFTWARE

A Mind Forever Voyaging	$26.95
ACCOUNTANT INC	$69.95
BUDDY 128 assembler	$42.95
C POWER from Proline	$59.95
DESK MANAGER 128	$34.95
I am the C128	$24.95
VIZASTAR 128	
MACH 128	$39.95
MATRIX from Prog.Periph	$47.95
PARTNER 128	$54.95
PERSONAL ACCT 128	$34.95
SYLVIA PORTER'S personal finance planner	$CALL $54.95

ALL COMMODORE PRODUCTS ON SALE NOW!!

AMIGA PACKAGES	$CALL
AMIGA EXTERNAL FLOPPY	$CALL
1670 MODEM	$124.95
1350 MOUSE	$39.95
C128 COMPUTER	$NEVER LOWER
1571 DISK DRIVE	$CALL
1902A	$LOWEST PRICE EVER
1750 RAM EXPANSION	$CALL
1802C	$199.00
1700 RAM EXPANSION	$99.00

COMMODORE 64C

ONLY $169.95

Includes GEOS & Quantum Link

1541C DISK DRIVE..... $CALL
1802C MONITOR..... $CALL

Berkeley Softworks

GEOS	$39.95
Fontpack 1	$CALL
Writers Workshop	$33.95
Geodex	$27.95
Deskpack	$22.95

To order by mail: We accept money order, certified check, personal check. Allow 2 weeks for personal check to clear.

Shipping: $4.00 for software and accessories/ $10.00 for printers and color monitors/ $8.00 for disk drives and other monitors/ Add $3.00 per box shipped COD. Call for other shipping charges. Additional shipping required on APO, FPO, AK, HI, and foreign orders.

Terms: ALL PRICES REFLECT CASH DISCOUNT, ADD 1.9% FOR MASTERCARD OR VISA. Manufacturer's warranty honored with copy of our invoice. **ALL SALES ARE FINAL.** Defective items replaced or repaired at our discretion. Pennsylvania residents add 6% sales tax. Prices and terms subject to change without notice.

- If through some oversight we don't have the lowest price, we would appreciate the opportunity to beat it. If we can, you will get the benefit of our Federal Express shipping on software orders over $50.00.
- Purchase orders are accepted from qualified corporations and institutions.
- No sales tax on orders outside of PA.
- Buy with confidence. We honor manufacturers warranty.
- We accept Mastercard, Visa, COD and mail orders.

MasterCard VISA

CALL TOLL FREE 1-800-468-9044

tcp

8088 microprocessor running at 4.77 MHz, MS-DOS 3.2, a PC-XT compatible BIOS, a PC-XT compatible keyboard, and GW BASIC 3.2. There are also five full-sized expansion slots. The power supply can support two floppy drives, a 40-meg hard disk, and five expansion cards. The units also offer as standard equipment an RS-232 serial port, a Centronics parallel port, and an ATI Graphics Solutions Adapter, which is a built-in monochrome and color display card compatible with IBM, CGA, MDA, Hercules, and Planatronics video modes.

What do Commodore's clones mean for the 64, 128, and Amiga? Apparently not much, as far as sales and distribution are concerned. Sales of all three of the computers remain strong, Commodore's financial position has stabilized, and 1987 may turn out to be one of Commodore's best years in quite some time. At worst, Commodore officials expect the MS-DOS computers to have some impact on the amount of shelf space dealers have available for the 128.

Commodore's *New* Amigas

Selby Bateman, Features Editor

Not all of Commodore's products for 1987 were displayed on the floor of the Winter Consumer Electronics Show in Las Vegas. In a small room on the second level of Commodore's two-story exhibit booth, selected dealers and the press were given sneak previews of two new Amiga computers, offshoots of the original Amiga 1000.

Scheduled for introduction sometime this spring are the Amiga 500, a low-cost computer (under $650) with all the functionality of the earlier Amiga, and the Amiga 2000, an expandable multi-processing machine that starts for under $1,500 and can be built into a powerhouse micro with up to nine megabytes of memory.

With these introductions, Commodore provides three Amigas that can reach virtually any market niche, from the entry-level consumer to high-end professional and business markets. All three of the Amigas are 100-percent compatible with one another as long as the software follows the rules for version 1.2 of the Amiga operating system.

For those not thoroughly familiar with the Amiga, the most important points are these: Introduced in the fall of 1985, the Amiga 1000 was immediately recognized as a genuine breakthrough personal computer, featuring superb color graphics and stereo sound capabilities as well as true multitasking (running more than one active program simultaneously).

Based on the Motorola 68000 microprocessor, the Amiga also has three integrated custom chips—

Commodore's new Amiga 2000 computer is an expandable powerhouse machine that features both Amiga and IBM card slots; up to nine megabytes of RAM; a flexible combination of 3½-inch, 5¼-inch, and hard disk slots; a reconfigured keyboard; and the ability to run IBM and Amiga software simultaneously.

Over 50,000 sold in just four months!

FREE TRIP TO RUSSIA

And you don't even have to leave your room.

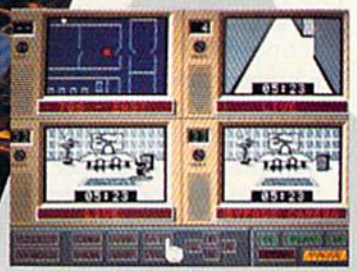
The Russians have *The Doomsday Papers*™ locked deep in a Siberian stronghold. With them, they can bring the world to its knees.

The U.S. government needs your help. Using their satellite you can get into the complex with your computer. All you have to do is locate the combinations to the safe, find and open it, and get the documents out.

Sounds simple enough. Unfortunately, it's not that easy. There are video cameras and monitors to be avoided. Guard patrols. And something called…The Annihilator. Plus, your only map is the one you've got to make while not being discovered by all of the above.

Your reputation got you into this mess. Your hacking skill is the only thing that can get you out. Bon Voyage.

Hacker II: The Doomsday Papers, designed by Steve Cartwright, who brought you the award winning challenge of Hacker.™



Hacker II for Commodore 64/128, Apple II, IBM PC/PCjr and Tandy 1000, Amiga, Atari ST and Macintosh computers. Coming soon for the Apple IIGS.

TEMPTATION.
To stumble into somebody else's computer system. To be someplace you're really not supposed to be. And to get the
HACKER
strange feeling that it really does matter. "LOGON PLEASE." is all you get to start with. That's it. From there, it's up to you. If you're clever enough and smart enough, you could discover a world you've never before experienced on your computer. Very tempting.

And For The Complete Hacker Experience…

Don't miss the original *Hacker*—the one that got it all started!

For more information and the dealer nearest you call 800/227-9759 (in California, call 415/960-0410) weekdays 10:00 a.m. to 4:00 p.m. Pacific time.

ACTIVISION
ENTERTAINMENT SOFTWARE®

Commodore 64, 128 and Amiga are trademarks of Commodore Electronics Limited. IBM is a trademark of International Business Machines Corporation. Tandy is a trademark of Tandy Corporation. Atari and ST are trademarks of Atari Corp. Apple and Macintosh are trademarks of Apple Computer. Activision is the registered trademark of Activision, Inc. © 1986 Activision, Inc.

code-named Portia, Daphne, and Agnes—which, respectively, control sound and input/output, video, and memory access. Agnes also coordinates the *blitter* and *copper* devices, which help the Amiga produce its amazing graphics and animation.

With monitor, the Amiga 1000 originally sold for about $2,000, although prices during 1986 dropped below $1,500. As you'll see, the two new Amigas dramatically change the future of the Amiga in terms of both price and expandability.

The Amiga 500

To paraphrase Apple Computer's Macintosh slogan, Commodore's new A500 is the Amiga for the *rest* of us.

For about half the price of the original 1000, the Amiga 500 comes with 512K of RAM, twice as much memory as its predecessor; a built-in 880K 3½-inch floppy disk drive; an expanded keyboard with separate cursor and numeric keypads; the Kickstart 1.2 operating system built into ROM instead of on disk; and a 35-watt external power supply. (The Amiga 500 uses about half the power of the 1000.) Unlike the original Amiga, the new machine's keyboard is not detached; instead, the one-piece unit resembles a cross between a Commodore 128 and an Atari 1040ST. The computer and keyboard are all one unit, and the drive is built into the right-hand side.

Commodore engineers radically redesigned the Amiga motherboard to make the 500 more economical to manufacture. The whole computer is now contained on a single, compact board. Yet, the only capability which suffered is that the weaker power supply will have to be supplemented if large amounts of extra memory or other devices are added. As with the earlier 1000, the 500 has two mouse/joystick ports, stereo audio outputs, RGB and composite video outputs, and the same system expansion bus. Only one change was made: The genders of the RS-232 serial port and Centronics-standard parallel port were swapped, so the Amiga 500 will work with commonly available IBM PC modem and printer cables. Also, Commodore senior engineer Jeff Porter says that Commodore is working on an optional RF modulator so the 500 can use a television as a monitor.

The 500 even makes it easier to expand memory to a full megabyte. Beneath the computer is a small, easily removable cover which hides a connector for a 512K memory expansion card. Installing the card is about as easy as plugging in a joystick. Commodore says the card will sell for under $150 and include a battery-backup realtime clock.

The Amiga 500 works with the same monitors as the Amiga 1000. Commodore's new $350 A2002 monitor can be switched between RGB and composite video, just as with the present 1080 monitor.

With color RGB monitor, a 512K Amiga 500 system will cost about $1,000; a one-megabyte system with monitor, about $1,150. Each Amiga 500 comes with a Workbench 1.2 disk, Amiga BASIC disk, and the usual manuals.

The only Amiga peripheral that won't work with the Amiga 500 is the long-awaited Genlock video interface. This is solely because of the Amiga 500's different physical configuration. Porter says a redesigned Genlock will probably be introduced for the 500.

The Amiga 2000

The real powerhouse of the Amiga lineup will be the Amiga 2000, a machine that can be expanded with up to nine megabytes of internal memory and which contains both Amiga and IBM PC expansion slots—including space for an optional Amiga Bridge card that lets the Amiga run IBM PC software.

The basic Amiga 2000 system, which is expected to sell (without monitor) for under $1,500, will have one meg of memory, seven expansion slots, a built-in 880K 3½-inch floppy disk drive, three drive ports, a detached keyboard, and a 200-watt power supply. The front of the Amiga 2000 system box contains space for two additional 3½-inch drives and one half-height PC-compatible 5¼-inch drive. These drive spaces accept any combination of floppy and hard drives. Inside the system box, you can add an almost unlimited variety of boards, drives, and coprocessors.

For example, you can add hard drive cards, math coprocessors, a multifunction card, video digitizers, graphics cards, and many others. You can divide a hard disk into one section for the Amiga and another section for the IBM PC, and transfer data back and forth between the two systems. And, by using the Bridge card, which plugs into two slots on the main circuit board, you can work with IBM PC files and Amiga files simultaneously—using the strongest features of each machine to accomplish whatever tasks you want.

Physically, the Amiga 2000 is similar in appearance to the 1000, but with a taller system box to allow for the extra disk drives and the card slots. The 95-key keyboard has been enlarged and slightly reconfigured. The mouse, keyboard, and joystick ports on the 2000 are clustered up front rather than being separated to the right side and the underside as on the 1000. And, importantly, the rear of the 2000 has standard connectors and IBM-style vertical slots, rather than the 1000's nonstandard connectors.

The Amiga 2000 will be able to use Commodore's new A2080 long-persistence monitor (about $500), which eliminates the jittery screen images that currently plague the Amiga 1000's highest-resolution screen modes.

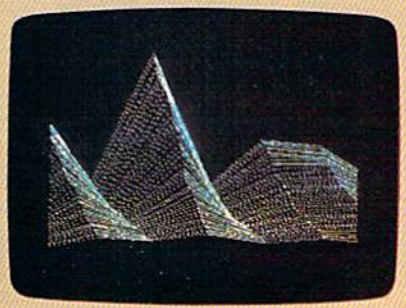
The open architecture of the Amiga 2000 gives it a solid basis for future growth and modification. And the ingenious mixture of IBM and Amiga slots means that programmers can write hybrid software to take advantage of the best capabilities of each machine.

With the introduction of both the 500 and the 2000, some observers expect that the original Amiga 1000 will be gradually phased out. But, as a Commodore spokesperson put it, as long as there's a marketplace anywhere in the world that wants the 1000, Commodore will more than likely continue to manufacture it. For current Amiga owners, the good news is that the new systems don't in any way make their computers obsolete.

The Amiga 500 and 2000 provide a strong foundation on which Commodore—a company which in 1986 pulled itself out of a financial quagmire—can grow in the future.

BUILT FOR SPEED

Now Get Inside Your Commodore with *COMPUTE!'s Gazette Disk.*



Now there's a way to get all the exciting, fun-filled programs of ***COMPUTE!'s Gazette***—already on disk—with ***COMPUTE!'s Gazette Disk***.

Subscribe today, and month after month you'll get a new, fully-tested 5¼-inch floppy disk guaranteed to run on your Commodore 64 or Commodore 128 personal computer.

COMPUTE!'s Gazette Disk brings you all the latest, most challenging, most fascinating programs published in the corresponding issue of ***COMPUTE!'s Gazette***. So instead of spending hours typing in each program, now all you do is insert the disk...and your programs load in seconds.

RESULT: You have hours more time to enjoy all those great programs which appear in ***COMPUTE!'s Gazette***—programs like Disk Editor, Face-Off, Turbo Copy, Arcade Baseball, Sound Designer, SpeedScript, and hundreds of others.

So don't waste another moment. Subscribe today to ***COMPUTE!'s Gazette Disk*** at this money-saving price. Take a full year's subscription for just $79.95. You save 58 percent off the single issue price. Subscribe for two years and save even more! Return the enclosed card.

Call toll-free 1-800-247-5470 now.
(In Iowa call 1-800-532-1272)

Individual issues of the *Disk* are available for $12.95 (plus $2.00 shipping and handling) by calling 1-800-346-6767 (in NY 1-212-887-8525).

Fine-Tuning The Software Market

Kathy Yakal, Assistant Features Editor

In the home market, with any electronic medium, you have to have fantastic audiovisual capabilities....Entertainment is going to be the big market that pulls it [the home computer] in. That's determined every other consumer electronic medium that's gone into the home.

—Trip Hawkins, President, Electronic Arts

The quality and innovative nature of new software—especially entertainment programs—continue to be crucial to the growth of today's home computer market. As Trip Hawkins and other industry leaders point out, the emphasis will increasingly be on supplying the same advanced sound and graphics that are so much a part of this technology-driven audio/video age.

At the Winter Consumer Electronics Show (CES), key computer manufacturers like Commodore and Atari continued to point the way toward greater computer audio/video capabilities with the Amiga and ST computers. And software publishers also displayed—and discussed—new programs that will stretch today's technology and will interest both new and experienced computer users.

Although there were not as many new-product announcements as in past years, and the number of highly visible software exhibitors on the floor was lower than at recent shows, many agree that this is just a part of the natural evolution of this segment of the industry. With only four major groups producing hardware for the home market—Commodore, Atari, Apple, and the MS-DOS–compatible companies—and with more realism about consumers' needs and wants, there seems to be less urgency to release dozens of new products monthly.

"New hardware with exciting price/performance characteristics, improvements in hardware and software retailing and distribution, and exciting new software ideas reawakened consumer excitement about home computing this past year," says Jim Levy, who recently stepped down as president of Activision Software. "As these conditions continue to develop, we expect sales rates of both new computers and software to pick up. The industry seems to be entering a new long-term growth phase."

Familiarity And Depth

While the growth phase that Levy mentions shows signs of a maturing and healthy market, it's clear that personal computers in the home are still far less common than many other consumer electronic products.

"In 1982, 4 percent of U.S. households were active users of home computers," says David Seuss, president of Spinnaker Software. "In 1986, 4 percent of U.S. households were active users of home computers. Compare that to VCRs (videocassette recorders). In 1982, 0 percent of U.S. households had VCRs. In 1986, 40 percent had one and used it every week. Why did it happen for VCRs and not computers? I think the simple answer is that the three preconditions of home electronics devices have not been met by our industry."

Those preconditions, according to Seuss and others, are a common computer standard, universal software compatibility, and operating procedures that all consumers can use easily. In other words, home computers need to be as universally standard as telephones or stereos or VCRs. Anyone who has a nodding acquaintance with the personal computer industry knows that's far from the current situation.

There are three areas that the software industry needs to address, Seuss adds. First, in the area of entertainment and education, more audio/video stimulation needs to be provided than has been provided in the past. "Computer-generated graphics are crude by standards that consumers use to judge video and audio stimulation," he says. "We have to deliver TV-quality pictures and sound."

Second, the process of getting information must be streamlined. "Every fact that exists in the world can be accessed by a patient librarian. The reality is none of us ever uses a millionth of the information that is relevant to a particular task we have," he says. "The reason is all of this data is simply not available in an efficient, accessible way."

And, finally, there need to be more practical applications for the home user. "I think sometimes we have been too grand in our aspirations for applications," Seuss says. "For example, we put together a complete home financial system that 95 percent of purchasers are not using within one week of purchase date. Programs are too ambitious, and require consumers to spend hours and hours every week utilizing the program. Don't give me an enormous financial accounting system for my home. Give me a program that calculates how much insulation I need in my walls."

Entertainment A Priority

Entertainment, education, information retrieval, and management of personal affairs are all tasks that the expanded memory, speed, and audio/video capabilities of the latest computers will better handle. In the meantime, today's software

publishers continue to deliver more finely-tuned products for accepted home applications.

Entertainment needs of consumers vary, but software sales figures point to the characteristics of those most widely enjoyed: simulations of real-life experiences, games incorporating familiar characters and/or themes, and entertainment products that stretch the graphics and sound capabilities of a machine and provide a rich and creative intellectual challenge or a demanding test of reflexes.

In those areas, a variety of new programs were announced at Winter CES. In fact, games comprised the lion's share of new product offerings for Commodore. As many industry leaders observed there, computer games seem to be enjoying a resurgence in popularity.

The following software programs were among those introduced at CES. Look for information on more new software in upcoming issues.

* * * * * * * * * * * * *

In Accolade's Comics, *you take on the persona of Steve Keene, and help thwart evil for the Chief of Spystuff, Inc. Detailed graphics and animation and a user-directed plot make this entertainment experience similar to directing the action in a comic book.*

Accolade

This entertainment software producer, which celebrated its first birthday at the show, announced *Accolade's Comics*, an interactive computer comic book. The story centers around Steve Keene, a spy whose mission is to foil evil plots for the Chief of Spystuff, Inc.

Unlike text-only adventures, *Accolade's Comics* offers the visual experience of reading a comic book on a computer screen, combining detailed graphics and animation. The player determines the direction of the story by continually selecting from a series of possible answers to questions asked of Keene. Some are dead ends, and others lead the player into various themes and plot twists. Because the user directs the plot, a variety of different endings are possible each time the game is played. Arcade action is incorporated when Keene falls into traps, inescapable positions, and embarrassing situations. The game retails for $39.95.

Accolade
20833 Stevens Creek Blvd.
Cupertino, CA 95014

"Leave her alone, you...." Last summer's hit movie Aliens *provides the characters and story for one of Activision's latest releases,* Aliens: The Computer Game.

Activision

Two years in the making, a graphics-and-text adventure titled *Portal* made its debut at CES. Rather than using a puzzle-solving or branching story approach, *Portal* is narrative literature, allowing the player to interact with the story and explore the unfolding futuristic world.

Transported to the year 2106, you are a lone space traveler who returns to earth and discovers that all of its inhabitants have vanished. Together with the sole survivor, a biological computer named Homer, you must find out why. Activision worked with adventure and science fiction author Rob Swigart to develop this unique approach. Suggested retail price is $39.95.

Another new game introduced by Activision is *Aliens: The Computer Game* ($34.95), based on last summer's hit movie.

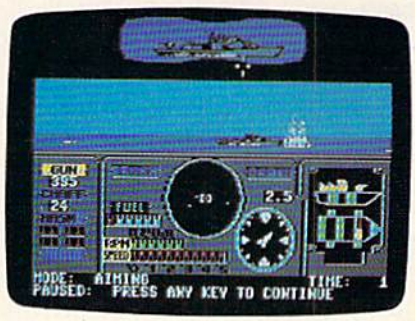
Activision
2350 Bayshore Pkwy.
Mountain View, CA 94043

Electronic Arts

Long a leader in discovering software-design talent, Electronic Arts has expanded its multimachine line of computer software and has introduced several new products for the Commodore 64.

Dan Dare: Pilot of the Future is a best-selling British import featuring Dan Dare, the U.K.'s most popular comic book hero. The game follows the adventure of Dare and his engaging pet, Stripey, as they travel to a distant asteroid and neutralize the threat posed by alien Treens. Each screen is a comic book panel complete with captions, full-color 3-D cartoon graphics, mazes, puzzles, fistfights, and a realistic soundtrack. Suggested retail price is under $20.

In *PHM Pegasus*, a combat simulation game, players complete a basic hydrofoil training session and become part of the T.A.G. (Terrorist



Commodore 64 games have been a mainstay of the Electronic Arts product line. Among those new products announced for the 64 at CES are Dan Dare: Pilot of the Future *and* PHM Pegasus.

Action Group) force. The task force can be called to action in any of the dangerous assignments awaiting the crew aboard the battle craft Pegasus, a hydrofoil armed with a cannon, chaff rockets, Harpoon or Exocet missiles, and Gabriel missiles. Heads-up onscreen displays reveal both your view from the craft's bridge and the view from an operations map. The price is $39.95.

The Bard's Tale II, 50-percent larger in program size and more challenging than its predecessor, revolves around your attempts to halt an evil force threatening to destroy the Realm. The fantasy world contains six complete cities and 25 dungeon levels. Animated monsters, magic spells, and realtime puzzles are among the special effects included to make the game an entertaining visual and intellectual challenge. *Bard's Tale II* is priced at $39.95.

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404

Epyx is well-known as a producer of realistic sports simulations for the Commodore 64. Street Sports Basketball *is the first title in its new Street Sports line.*

Epyx

Epyx's early reputation in this industry stemmed from popular fantasy/role-playing games like *Temple of Apshai*. More recently, graphics/action-intensive hits like *Summer Games* helped maintain its reputation as a software leader. At CES, Epyx clearly broadened its scope, introducing games of both types, as well as a new productivity product.

Sub Battle Simulator, the first title in Epyx's new Masters Collection, is a detailed submarine simulation set during World War II, where players are put in command of one of six different classes of U.S. Navy submarines or German Kreigsmarine U-boats. Staged in either the Atlantic or the Pacific, the game allows players to choose from over 60 different missions or play out the entire war. Each mission is based on genuine historical data.

Street Sports Basketball is the lead title for a new line of sports software. Players pick their own three-person team from ten individuals with varying degrees of skill in different areas. Four neighborhood scenes, each with its own unique props like curbs, oil slicks, and fences, serve as challenging scenarios for fast-paced athletic action.

Epyx
600 Galveston Dr.
Redwood City, CA 94063

Firebird

Firebird, U.S. licensee for a continuing flow of home computer software from England and Europe, made a dramatic entrance into this market a year and a half ago with *Elite*. Firebird has since brought over a number of popular programs for all major home computer systems, including the graphically rich adventure, *The Pawn*. Besides introducing a business line at CES, Firebird announced several new programs for the Commodore 64, including a followup to *The Pawn* titled *Guild of Thieves*, which, from a sneak preview, looks to be even more graphically impressive than its predecessor.

In *Tracker* ($39.95), the player is given simultaneous control of eight Skimmer crafts to try to destroy the marauding hordes of renegade Cycloids. Fast maneuvers, high-speed 3-D battle sequences, and demanding play action challenge the player's reflexes, while the program's intuitive design also challenges the player intellectually.

Starglider ($39.95) puts the player in command of an airborne ground attack vehicle which must eventually do battle with the starship Starglider. Already a hit on the Atari ST, this game requires cunning, skill, and quick reflexes.

Firebird Licensees
P.O. Box 49
Ramsey, NJ 07446

Infocom/Activision

Infocom set the standard for text adventure games with such classic programs as the *Zork* trilogy and many other respected games that followed. Recently acquired by Activision, the company continues to create a product line serving all major home computers.

In *Hollywood Hijinx* ($34.95), your Hollywood B-movie-mogul uncle, Buddy Burbank, and his wife have left you their entire estate, with one stipulation: You must find ten treasures hidden throughout their sprawling Malibu home. If you can't find them in one night, you lose the whole inheritance.

Bestselling humor writer Douglas Adams produced a zany hit for Infocom with his computer version of *Hitchhiker's Guide to the Galaxy*. Now he has designed *Bureaucracy*, in which you explore the endless layers of red tape that bind up bureaucratic institutions.

Infocom
125 Cambridge Park Dr.
Cambridge, MA 02140

MicroProse

A leader in simulation software, MicroProse announced an agreement recently made with author Tom Clancy to develop his number-one bestselling book, *Red Storm Rising*, into a home computer game along the lines of MicroProse's other military simulation software. The title is expected to appear sometime in late 1987.

MicroProse
120 Lakefront Dr.
Hunt Valley, MD 21030

Mindscape

Mindscape made its entry into the software market as an educational publisher, but has since gone on to market a line of entertainment programs, in addition. Five new arcade games for the Commodore 64 were announced at CES, including *Trailblazer*, a series of soccer races that offers a two-player split screen; and *Parallax*, a space exploration mission that turns into a battle to save the earth ($29.95 each).

Mindscape
3444 Dundee Rd.
Northbrook, IL 60062

DATA EAST BRINGS ARCADE REALISM HOME!

ENTER THE DATA EAST SWEEPSTAKES

OVER 100 PRIZES – Win free Data East Computer Games, a real Data East Arcade Game, and a trip for two to the National Arcade Expo!

No purchase necessary. See participating dealers for details. Void where prohibited. *

KARATE CHAMP – Put on your black belt and challenge your friends or the computer through nine picturesque settings in this leading Martial Arts game to become the Karate Champ. For Commodore 64/128™ and Apple II® series.

COMMANDO* – As the crack shot Commando, battle overwhelming odds to defeat advancing rebel forces! Armed with only a machine gun and hand grenades, you must reach the fortress. For Commodore 64/128™, Apple II® series, and IBM.

IKARI WARRIORS* – Behind enemy lines, guerilla warfare are your tactics as you and your partner battle through the jungles, rivers, ruins, and opposing entrenchments in this interactive 2-player arcade hit. For Commodore 64/128™.

BREAKTHRU – Your mission is to retrieve the secret fighter plane stolen by hostile renegades. Use your sophisticated assault vehicle to Break Thru each of the five enemy strongholds. For Commodore 64/128™.

EXPRESS RAIDER – Bandits have seized the Gold City Express. Rescue the passengers, save the train, and recapture the loot! For Commodore 64/128™.

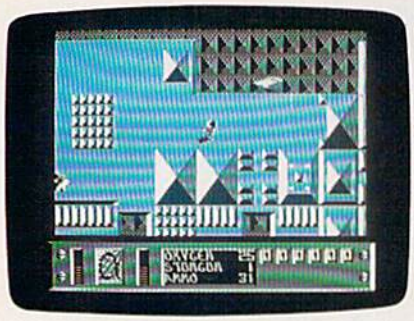
TAG TEAM WRESTLING – Teamwork and stamina are the keys, as you and your partner battle your way through the Title Matches on your quest for the belt. For Commodore 64/128™, Apple II® series, and IBM.

KUNG-FU MASTER* – Battle the evil forces through the five dangerous floors in the wizard's castle to rescue the captive fair maiden. For Commodore 64/128™ and Apple II® series.

DATA EAST

DATA EAST USA, INC. 470 NEEDLES DRIVE, SAN JOSE, CALIFORNIA 95112. (408) 286-7074.

© 1986 DATA EAST USA, INC. *COMMANDO, IKARI WARRIORS, AND KUNG-FU MASTER MFD. UNDER LICENSE FROM CAPCOM USA, SNK CORP., AND IREM CORP. RESPECTIVELY
COMMODORE, APPLE, AND IBM ARE REGISTERED TRADEMARKS OF COMMODORE ELECTRONICS LTD., APPLE COMPUTERS, INC., AND IBM, RESPECTIVELY.
* DATA EAST SWEEPSTAKES – OHIO RESIDENTS MAY ONLY ENTER BY MAILING A 3" X 5" POSTCARD TO: DATA EAST, P.O. BOX 519, SAYREVILLE, NEW JERSEY 08872.



Since its startup as an educational software publisher in 1983, Mindscape has diversified its line to include software in the areas of entertainment, personal productivity, and desktop publishing. Five new arcade games for the Commodore 64 were introduced at CES, including Parallax.

Simon & Schuster

Prompted by the success of last year's bestselling graphics-and-text adventure, *Star Trek: The Kobayashi Alternative*, Simon & Schuster has released its second Star Trek fantasy, *The Promethean Prophecy* ($32.95). While exploring an unmapped sector of space, the Enterprise is attacked by aliens who contaminate the food supply, requiring you to beam down to a nearby planet to replenish the supply. To win the game, you must solve a series of puzzles found on the planet. The game's parser (the portion of the program that interprets your commands) was two years in development; it understands nearly 1000 words and can handle multiple sentences and objects.

Simon & Schuster
One Gulf + Western Plaza
New York, NY 10023

Inexpensive Classics

In addition to new products at CES, several companies announced new lower prices and bundled packages of older classic software game titles. These games run the gamut from arcade-action to strategy.

The Accolade Avantage line includes the *Spy vs. Spy I & II* action-strategy programs, the fast-action *Deceptor*, and the war strategy program *Desert Fox*, for $14.95 each.

Electronic Arts added to its line of Software Classics with *Archon II: Adept* and *Skyfox*, two action-strategy games; *Movie Maker*, an animation program; *Financial Cookbook*, a collection of personal finance and budget programs; and *Mind Mirror*, a personality profile game by Timothy Leary; each for under $15.

Activision announced the first in its series of Solid Gold Software titles: the classic *Pitfall!* and *Demon Attack* will be packaged together and sold for less than $15. And Infocom has bundled the three programs in the *Zork Trilogy* for $59.95.

A Standard User Interface

All of these games, as well as a variety of productivity and educational products introduced at the show, share one characteristic: compatibility with the Commodore 64 and 128. But that's where the similarity ends.

When those differences add to the variety and interest of a game or an educational package, that's no problem. But, say some observers, the many differences among computers and software shouldn't needlessly confuse and inhibit computer users.

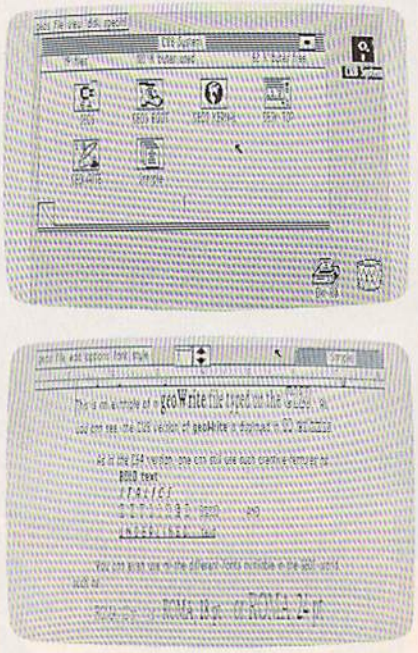
Take word processing programs, for example. Though many can execute the same text-editing functions, the commands necessary to use those features are different for each program. But, as Seuss has noted, for widespread acceptance of computers, the hardware and software should be as standardized and as compatible as possible—just as with television sets, toasters, and VCRs.

And that has already started to happen. "A lot of hardware companies have contributed, I think, to the standardization process, by starting to have a mechanism for a graphics environment interface," says Seuss. "Whether it's Atari with its PC-clone, Commodore with *GEOS*, or Apple with the Macintosh, there is a general movement in the direction of standardizing interfaces that will reduce drastically the differences between programs."

To have its product mentioned as an emerging standard might have seemed far-fetched to the *GEOS* designers at Berkeley Softworks even one short year ago. At the 1986 Winter Consumer Electronics Show, Berkeley premiered its new Commodore 64 operating system/user interface in a small booth, at a show where Commodore itself had little presence. Within the next 12 months, *GEOS* was adopted by Commodore as the official disk operating system for its 64, and a copy is now packaged with every machine that is sold. At the 1987 Winter CES, a financially rejuvenated Commodore drew impressive crowds at its booth, and Berkeley's presence in a large booth across the aisle was commanding.

Besides making disk access five to seven times faster and providing a friendly user interface that employs graphics like windows, icons, and pull-down menus, *GEOS* comes with its own word processing program, *geoWrite*, and drawing program, *geoPaint*. In addition, Berkeley continues to upgrade the system itself and offer add-on packages.

Writer's Workshop ($49.95) is a combination of four powerful *GEOS* application programs that provide a complete professional writing environment. *geoCalc* is a graphics-oriented spreadsheet that can be used for such financial tasks as bud-



At the Winter Consumer Electronics Show in 1986, Berkeley Softworks introduced GEOS, *which was adopted as the official graphics user interface for the Commodore 64. At the 1987 WCES, Berkeley premiered an 80-column version of* GEOS *for the Commodore 128 (in 128 mode). Berkeley also announced a number of new companion packages for the program, including* geoCalc *and* geoFile, *a spreadsheet and database manager.*

F L I G H T !

From the sophisticated realism, detail, and intellectual stimulation of Flight Simulator...

...to the brute-force fun, thrills and excitement of Jet...

...with new adventures in Scenery Disks...

...SubLOGIC. The State of the Art in Flight.

See Your Dealer. For additional product ordering information or the name of the dealer nearest you, call (800) 637- 4983.

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995
ORDER LINE: (800) 637-4983
(except in Illinois, Alaska and Hawaii)
Open 7 AM to 9 PM Central Time

geting, cost estimating, mortgage analysis, tax planning, and generating financial statements. *geoFile* ($49.95) is a database management system that lets the user set up a filing system using simply designed forms. *geoDex* ($49.95) is an electronic card file for names, addresses, phone numbers, and other miscellaneous information.

But perhaps the biggest news to come out of Berkeley Softworks at CES was its announcement of an 80-column version of *GEOS* for the Commodore 128. Expected to be available in the second quarter of 1987, this version will retail for $69, $10 more than its 64 counterpart.

Berkeley Softworks, 2150 Shattuck Ave., Berkeley, CA 94704.

For additional products introduced or exhibited at CES, see the News and Products section in this and upcoming issues.

On The Digital Horizon: Compact Disc–Interactive

Within the next few years, the crowded aisles and exhibit booths of the Consumer Electronics Show will contain one of the most exciting technological developments yet to come in the ongoing digital explosion: *compact disc–interactive*, currently referred to as CD-I.

Right now, no one can be sure exactly what this marriage of computers and compact laser discs will look like or how it will be introduced on a large scale. But the giant consumer electronics companies are already working hard on CD-I, and the computer software and hardware developers are looking at it with great interest.

To understand CD-I, you must first know a little something about the compact disc. Most people by now have heard of the growing popularity of audio compact discs, even if they don't yet own a disc player. These small plastic-coated aluminum discs contain music encoded digitally in pits that can be read by a low-power laser beam.

The same factors that make audio compact discs so popular apply to digital data from computers as well.

250,000 Pages Of Text

The two electronics companies that introduced audio compact discs to the world back in 1980—Sony and Philips—proposed the first digital-data compact disc application in 1983: *Compact Disc Read Only Memory (CD-ROM)*. A CD-ROM disc looks almost identical to an audio CD. But while a CD can hold only about 70 minutes of music, it can store up to 550 *megabytes* of data. That's about a quarter of a million pages of text.

With search-and-retrieval software, any of the data stored on the disc can be accessed in seconds and cross-referenced in a variety of ways. That capability makes CD-ROM an incredibly powerful research and reference tool for business, education, and, in more limited use, the home.

CD-ROM players are currently in production and dozens of applications are being developed. The first consumer-oriented package was produced by Grolier Electronic Publishing. Its *Academic American Encyclopedia*, along with a sophisticated indexing system, both fit on part of just one compact disc. The player-and-software combination (compatible with the IBM-PC) costs around $1,000.

In February 1986, Sony and Philips announced tentative specifications for a more consumer-oriented compact disc format, *compact disc–interactive*. CD-I combines state-of-the-art microcomputer technology with compact disc technology.

The initial technical specifications for CD-I call for a slightly modified CD-ROM player with a 68000 microprocessor (the same chip found in 16-bit computers like the Commodore Amiga, the Atari ST, and the Apple Macintosh) and a multitasking OS-9 operating system. So what you have is the processing power of the latest personal computers, the huge data storage capacity of CD-ROM, unmatched sound and music quality, and advanced graphics capabilities that will eventually allow full-motion video.

In addition, the manufacturers are working together to create a universal standard of compatibility. That means that you'll be able to play any audio CD or any CD-ROM disc on CD-I players manufactured by different hardware companies.

Computer software companies like Aegis Development are now beginning to explore the possibilities of the new compact disc–interactive (CD-I) technology.

CD-I technology will ultimately force us to rethink traditional notions of entertainment and education, says David Seuss, president of Spinnaker Software. For example, let's say you have a CD-I program that plays chess. You could store every game that's ever been played by grand masters. At any moment in a game, you could have the program display examples of how the experts handled similar or identical situations. And, of course, that's just the beginning.

With stereo sound, speech synthesis, full-motion video, and advanced graphics-and-text manipulation, CD-I players and programs will bring new meaning to the word *interactive*.

CD-I players and software may be widely available as early as Christmas of 1988. Much depends on whether the manufacturers of both hardware and software can continue to cooperate in the development of a single standard.

It's probable that by the early 1990s, advanced entertainment, educational, and productivity applications will be available through CD-I. This combination of computers and lasers has the potential to sell into millions of households over the next decade.

COMPUTER VICE

226 Lincoln Road
Miami Beach, FL 33139

Blue Max
New York City/Air Support
Zaxxon
Zepplin
Zepplin $6.77

Musicalc 1
Musicalc 2
Musicalc 3
Template 1 (Afro/Latin)
Keyboard
Christmas Diskette $6.77

Super Expander
Simons Basic
Nevada Cobol
Jupiter Lander
Kickman
Seawolf
Speed Bingo Math
Radar Rat Race
Visible Solar S.
Blue Print
Lazarian
Omega Race
Wizard of Wor
Le Mans
Gorf
Supermash
Strapost
Frogmaster
Star Ranger $4.77

Satans Hollow
Hulk
Avenger
Clowns
Fish Metic
Number Nabber
Pet Emulator
Pinball Spectacular
Solar Fox
Tooth Invaders $5.77

English II
English III
English IV
English VI $5.77

English SAT I
English SAT II
Math SAT I $9.77

Songwriter
Phi Beta Filer
Mastertype Fig. & Formulas $7.77

Triad
Zork I
Zork II
Zork III
Suspended
Starcross
Deadline $4.77

Manager
Magic Desk I
Easy Finance I
Easy Finance II
Easy Finance III $12.77

Jyruss
James Bond
Star Wars-Arcade Game
Q Bert
Popeye
Frogger
Frogger II Threedeep . . . $6.77

Comm Step By Step
Comm Step By Step
Picture Blocks
Preschool One
Reading What's Diff.
Vocabulary Builder I
Bocabulary Builder II
Wordwise-Analogies $3.77

Practicalc 64
64 Doctor
Practifile $14.77
(Database Manager)

Castle Wolfenstein
Rescue Squad
Beyond Castle Wolfenstein
Space Taxi
Smart Start (Utility)
New Super Text $6.77

Diamond Mine
Castle Hastle
Rack 'Em Up $4.77

Basic Coach
Computer Coach
Keyboard Coach
Speedreading Coach
Typing Coach $7.77

Totl Text 2.6
Totl Label 2.6
Time Manager 2.6
Research Assistant 2.0
Totl Speller 36
Totl Infomaster $3.77

Zortek Microchip
Easy Lesson/Quiz
Number Nabber/Shap Grab
Chopper Math
Type Write
Music Machine
Music Composer
Gulp!!/Arrow Graphics
Frenzy/Flip Flop
Next Letter or Num
Ltr Match More/Less $4.77

Retro Ball
Hes Mon 64
Hes Writer 64
6502 Prof. Dev. Sys.
Turtle Graphics II
Gridrunner
Benji Space Rescue $8.77

Codewriter
Adventure writer
File writer
Dialogue
Elf
Home Integrator
Thriller Series
Adventure Writer $14.77

SUPER CLOSEOUTS

Sales Edge
Management Edge
Negotiation Edge
Communication Edge
General Ledger ~~$74.95~~ NOW $14.77 EA
ALL 5 for $59.77

INFOCOM FOR ATARI ST

Cutthroats
Zork I
Zork II
Zork III
Planetfall
Spellbreaker
Suspended
Suspect
Your Choice 22.00 EA

Power Pad
3 Free Programs
(Koala Clone)
$39.90

3½ Sony Disks
SSDD
$12.90

Infocom
Hint
Books
$4.25 EA

6 outlet
Surge Protector
$19.90

5¼ Cleaner
$7.77

Intro to Basic I $7.77

Omni Calc
Multiplan $12.77

US Constitution
Death in the Caribbean
Heist
Boulder Dash $9.77

Easy Finance
Word Name Machine
Accounts Receivable
Accounts Payable $12.77

Starcross
Deadline
Suspended $9.77

SPECIAL

Jet by Sublogic $14.77
Tax Planner $8.77
1986 Taxpayers Survival . . $7.77

ORDERS ONLY

1-800-331-7074

CUSTOMER SERVICE OR IN FLORIDA (305) 538-1364

FREE FREIGHT ON ALL ORDERS WITHIN CONTINENTAL U.S. OVER $100.00

Orders under $100.00 add $4.00 shipping and handling. C.O.D. orders add $4.00.
Prices reflect a 3% cash discount. A.P.O., F.P.O. orders add 6% shipping & handling. Postal orders shipped surface
Add 6% for air shipment. Add 3% for VISA/MC. Florida residents add 5% sales tax. Personal checks allow 2 weeks for processing.
Prices Subject to Change Without Notice.

ORDERS RECEIVED BEFORE 12:00 PM WILL BE SHIPPED SAME DAY.

COMPUTE!'s GAZETTE Author's Guide

Here are some suggestions which serve to improve the speed and accuracy of publication for prospective authors. COMPUTE!'s GAZETTE is primarily interested in new and timely articles on the Commodore 128, 64, Plus/4, and 16. We are much more concerned with the content of an article than with its style, but articles should as be clear and well-explained as possible.

The guidelines below will permit your good ideas and programs to be more easily edited and published:

1. The upper left corner of the first page should contain your name, address, telephone number, and the date of submission.

2. The following information should appear in the upper right corner of the first page. If your article is specifically directed to one model of computer, please state the model name. In addition, *please indicate the memory requirements of programs.*

3. The underlined title of the article should start about 2/3 of the way down the first page.

4. Following pages should be typed normally, except that in the upper right corner there should be an abbreviation of the title, your last name, and the page number. For example: Memory Map/Smith/2.

5. All lines within the text of the article must be double- or triple-spaced. A one-inch margin should be left at the right, left, top, and bottom of each page. No words should be divided at the ends of lines. And please do not justify. Leave the lines ragged.

6. Standard typing or computer paper should be used (no erasable, onionskin, or other thin paper) and typing should be on one side of the paper only (upper- and lowercase).

7. Sheets should be attached together with a paper clip. Staples should not be used.

8. If you are submitting more than one article, send each one in a separate mailer with its own tape or disk.

9. Short programs (under 20 lines) can easily be included within the text. Longer programs should be separate listings. *It is essential that we have a copy of the program, recorded twice, on a tape or disk.* If your article was written with a word processor, we also appreciate a copy of the text file on the tape or disk. Please use high-quality 10 or 30 minute tapes with the program recorded on both sides. The tape or disk should be labeled with the author's name and the title of the article. Tapes are fairly sturdy, but disks need to be enclosed within plastic or cardboard mailers (available at photography, stationery, or computer supply stores).

10. A good general rule is to spell out the numbers zero through ten in your article and write higher numbers as numerals (1024). The exceptions to this are: Figure 5, Table 3, TAB(4), etc. Within ordinary text, however, the zero through ten should appear as words, not numbers. Also, symbols and abbreviations should not be used within text: use "and" (not &), "reference" (not ref.), "through" (not thru).

11. For greater clarity, use all capitals when referring to keys (RETURN, CTRL, SHIFT), BASIC words (LIST, RND, GOTO), and the language BASIC. Headlines and subheads should, however, be initial caps only, and emphasized words are not capitalized. If you wish to emphasize, underline the word and it will be italicized during typesetting.

12. Articles can be of any length—from a single-line routine to a multi-issue series. The average article is about four to eight double-spaced, typed pages.

13. If you want to include photographs, they should be either 5×7 black and white glossies or color slides.

14. We do not consider articles which are submitted simultaneously to other publishers. If you wish to send an article to another magazine for consideration, please do not submit it to us.

15. COMPUTE!'s GAZETTE pays between $70 and $800 for published articles. In general, the rate reflects the length and quality of the article. Payment is made upon acceptance. Following submission (Editorial Department, COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403) it will take from two to four weeks for us to reply. If your work is accepted, you will be notified by a letter which will include a contract for you to sign and return. *Rejected manuscripts are returned to authors who enclose a self-addressed, stamped envelope.*

16. If your article is accepted and you have since made improvements to the program, please submit an entirely new tape or disk and a new copy of the article reflecting the update. We cannot easily make revisions to programs and articles. It is necessary that you send the revised version as if it were a new submission entirely, but be sure to indicate that your submission is a revised version by writing, "Revision" on the envelope and the article.

17. COMPUTE!'s GAZETTE does not accept unsolicited product reviews. If you are interested in serving on our panel of reviewers, contact our Features Editor for details.

64 or 128

in·no·va·tion ***n.*** **1.** the process of making changes **2.** a new method, custom, device, etc. **3. Cadpak 4. BASIC Compiler** *see* Abacus

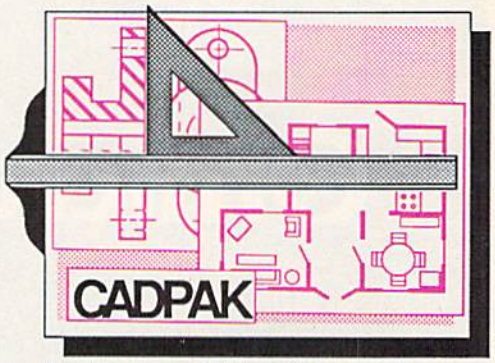
Features of ***Cadpak:***

- dimensioning for exact scaled output
- works with lightpen or keyboard
- copy artwork between two screens
- print in two sizes-full or 1/4 page
- add text in four different sizes—three special fonts included
- includes three tutorials
- create librarys of objects with Object Editor–math and electronic included
- design your own pattern fills
- size, rotate and reflect objects
- work in metric or english sizes
- includes USA map outline
- C-128 added features:
  - draw curves with up to 11 points
  - create templates which you can size or rotate at any degree
  - larger work area (640x360 pixels)

Cadpak

Design pictures and graphics quickly and precisely. Unlike other drawing programs, you can produce exact scaled output on your printer. Design in the units of your drawing problem (feet, miles, meters,etc.) and send hardcopy to most printers. Uses either the keyboard or a lightpen. Two separate work screens—transfer artwork from one screen to the other. Place text in four sizes anywhere in the picture—three extra fonts included: Old English, 3-D and Tech. "Try Again" functions allows you to undo a mistake. Solid or dashed lines, circles, ellipses at any angle, rays and boxes. Save and edit fill patterns, fonts and objects. ***Cadpak*** is the full-featured design package for your Commodore computer.

for the **C-64** **$39.95**
for the **C-128** **$59.95**



Design an addition to your house...
Remodel your apartment...
Create a layout for your garden...
Draw schematic diagrams...
Engineer a new widget...
all to scale!

Features of ***Basic Compiler:***

- compile to machine language, speedcode or a combination of both for added flexability
- supports overlay structures for large programs
- extensive compiler directives allow parameter changes during compilation
- use BASIC extensions such as Simon's BASIC, Video Basic, BASIC 4.0, VICTREE and others
- compile your programs to speed them up and to protect them from LISTing or altering
- C-128 version added features:
  - works with BASIC 7.0
  - works with FAST mode
  - make use of all 128K

BASIC Compiler

The complete compiler and development package. Make your programs 3 to 35 times faster. Compile you programs into machine language, speedcode (pseudo code) or a combination of both. With the overlay feature you can compile a series of programs that load in consecutively. Even compiles programs written with BASIC extensions (Simon's BASIC, VICTREE, BASIC 4.0, VideoBasic, others). Control memory management to give you total control over your compiled program. When the compiler recognizes an error, it continues to find other errors. C-128 version is completely compatible with BASIC 7.0, works with FAST mode and allows for use of all of 128K of RAM. If your program walks or crawls, give it the speed to RUN!

for the **C-64** **$39.95**
for the **C-128** **$59.95**

Abacus

P.O. Box 7219 • Dept. G4 • Grand Rapids, MI 49510 • Telex 709-101 • Phone 616/241-5510

Call **now** for the name of the dealer nearest you. Or order directly using your MC, Visa or Amex card. Add $4.00 per order for shipping. Foreign orders add $12.00 per item. Call (616) 241-5510 or write for your **free** catalog. 30-day money back software guarantee. Dealers inquires welcome–over 2000 dealers nationwide.

Omicron

Sean Wagle

Be ready and alert. A host of deadly enemies can make quick work of you in this frantically paced, multilevel arcade-action game for the 64. A joystick is required.

"Omicron" is a game which creates a universe full of hostile aliens. To play and win, you must survive 16 waves of 15 enemies each. This is anything but an easy task—you'll be facing some of the deadliest and fastest creatures ever to visit the screen of your computer.

Omicron is written partly in BASIC and partly in machine language (ML). First, type in and save Program 1, the BASIC section of the program. Since the BASIC section attempts to load the ML portion of the program, don't run the program until you've typed in and saved Program 2.

Typing in Program 2, the ML section of Omicron, requires use of the "MLX" machine language entry program found elsewhere in this issue. When you run MLX, you'll be asked for the starting and ending addresses of the data you'll be entering. For Omicron, respond with the following values:

Starting Address: 33CE
Ending Address: 43BD

When you've finished typing in the data, save a copy to disk before leaving MLX. You must save the data from Program 2 under the name OMICRON ML, since that is the name Program 1 looks for. If you're using tape instead of disk, change the ,8,1 at the end of line 10 in Program 1 to ,1,1. Also, be sure to save the data for Program 2 immediately following Program 1 on the tape.

The player is about to finish this level by destroying the last enemy unit, just one of a host of fast and deadly aliens.

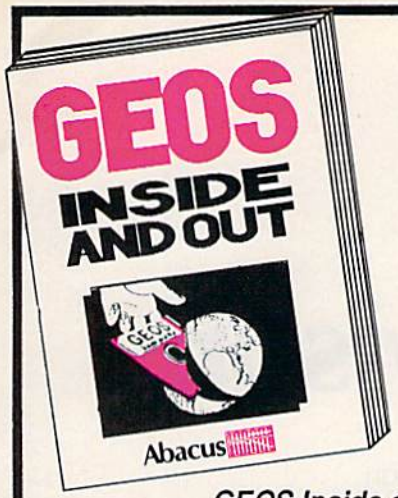
When you're ready to play Omicron, make sure that a joystick is first plugged into port 2; then load and run the BASIC program. *The game does not work properly unless the joystick is plugged in before you run the program.* When the title screen appears, choose one of the four skill levels by pressing a function key. It's recommended that you start with the Rookie level (f7) so you can get used to game play. The skill levels are as follows:

f1 Expert
f3 Pro
f5 Advanced
f7 Rookie

How To Play

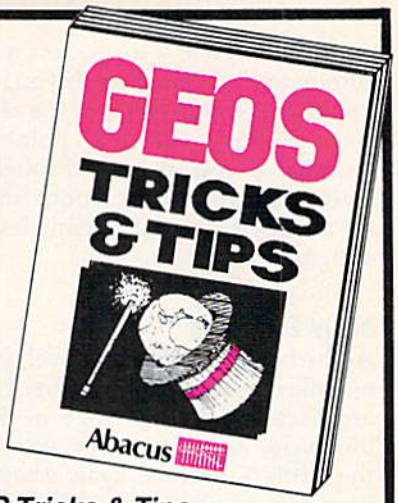
When the game begins, your first ship appears in the upper left corner of the screen. You and your enemies can move freely, but you'll bounce off the edges of the screen and off the status board in the center of the screen, which holds the score, current level, and number of ships remaining.

The first thing to master is the joystick control of your ship. You can fire missiles by pressing the fire button. To move, aim the joystick in the desired direction. Since your ship can build momentum, your direction does not change immediately. The direction in which the ship points does not change unless you press the fire button while moving the joystick, so with careful planning you can move in one direction and shoot in another.



GEOS

Books Hits!



GEOS Inside and Out

If you use GEOS then our new book, ***GEOS Inside and Out***, has the info you need.

A detailed introduction is laid out for the novice–beginning with how to load GEOS...how to create a backup...how to alter the preference manager...how to format disks...learn geoWrite and geoPaint in detail. Easy to understand examples, diagrams and glossary are included to enlighten the beginner.

The advanced user will find more detailed information on GEOS's internals and useful tricks and tips. Add a constant display clock–includes assembly and BASIC listing...complete listing of our **FileMaster** utility (converts your programs to GEOS format with an icon editor) with a line by line explanation...create a single-step simulator for observing memory and system registers...learn about windows and how to use them to your advantage...understand GEOS file structure.

If you're just getting started with GEOS or getting to the point of wanting to add your own applications, then ***GEOS Inside and Out*** will help you on your way. $19.95

GEOS Tricks & Tips

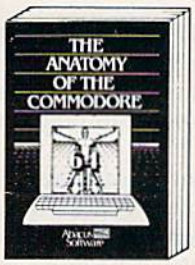
Continuing the tradition established by our famous C-64 reference library, ***GEOS Tricks & Tips*** is a collection of helpful techniques for anyone who uses GEOS with their Commodore. It's easy to understand without talking down to the reader, and detailed in the applications of the routines. Includes a font editor to create up to 64 point text and a machine language monitor. A perfect companion volume to ***GEOS Inside and Out.*** Available Second Quarter. $19.95

You Can Count On **Abacus**

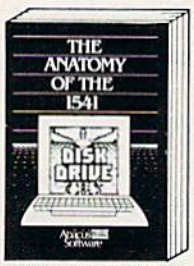
P.O. Box 7219 • Dept. G4 • Grand Rapids, MI 49510
Telex 709-101 • Fax 616/241-5021 • Phone 616/241-5510

To receive your copy of ***GEOS Inside and Out*** and/or ***GEOS Tricks & Tips***, call now for the name of the dealer or bookstore near you. Or order directly using your Visa, MC or Amex card. Add $4.00 per order for shipping and handling. Foreign orders add $12.00 per book. Call or write today for your free catalog. Dealer inquires welcome—2000 nationwide. GEOS, geoWrite, geoPaint are tradenames of Berkeley Softworks.

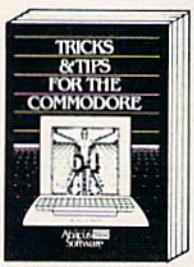
Just a few of our books...



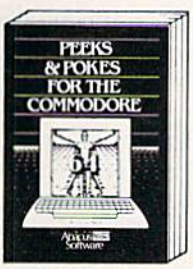
Anatomy of the C-64
Insider's guide to 64 internals. Graphics, sound, I/O, kernal, memory maps, and much more. Complete commented ROM listings. **300pp** $19.95



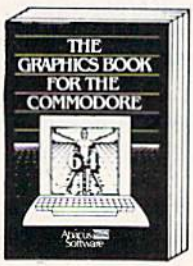
Anatomy of the 1541 Drive
Best handbook on this drive, explains all. Filled with many examples programs, utilities. Fully commented 1541 ROM listings. **500pp** $19.95



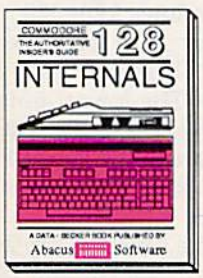
Tricks & Tips for the C-64
Collection of easy-to-use techniques: advanced graphics, improved data input, CP/M, enhanced BASIC, data handling and more. **275pp** $19.95



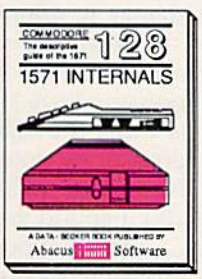
Peeks & Pokes for the 64
Includes in-depth explanations of PEEK, POKE, USR, and other BASIC commands. Learn the "inside" tricks about your '64. **200pp** $14.95



Graphics Book for the C-64
Best reference, covers basic and advanced graphics. Sprites, Hires, Multicolor, 3D-graphics, IRQ, CAD, projections, curves. **350pp** $19.95

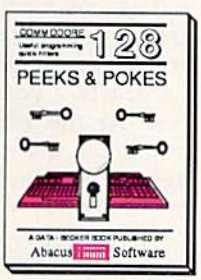


C-128 INTERNALS
Important C-128 information. Covers graphic chips, MMU, I/O, 80 column graphics and fully commented ROM listings, more. 500pp $19.95



1571 INTERNALS
Essential reference. Internal drive functions. Explains various disk and file formats. Fully-commented ROM listings. 450pp $19.95

C-128 TRICKS & TIPS
Fascinating and practical info on the C-128. 80-col hires graphics, bank switching. 300 pages of useful information for everyone. $19.95



C-128 PEEKS & POKES
Dozens of programming quick-hitters. techniques on the operating system, stacks, zero page, pointers, and BASIC. 240pp $16.95

C-128 BASIC 7.0 Internals
Get all the inside info on BASIC 7.0. This exhaustive handbook is complete with fully commented BASIC 7.0 ROM listings. $24.95

Call now for the name of your nearest dealer. Or order direct with your credit card by calling 616/241-5510. Add $4.00 per order for S&H. Foreign add $12.00 per book.

Other books and software also available. Call or write for your **free catalog**. Dealers inquires welcome—over 2000 nationwide.

Commodore 64 and Commodore 128 are trademarks of Commodore Ltd.

Abacus

P.O. Box 7219
Dept. G4
Grand Rapids, MI 49510
Telex 709-101 • Fax 616/241-5021
Phone 616/241-5510

To complete a level, you must eliminate all 15 enemies. If you lose a ship, you'll start over on the same level. A bonus of 1000 points is awarded if you make it through a level on your first try. Bonus ships are awarded after completing levels 4, 8, and 12.

Your Enemies

At the beginning of each level, your enemies are dark blue *drifters.* They are harmless at this stage in their life cycle. As time passes, some of the drifters become cyan *bombers.* Bombers leave an assortment of deadly objects in their wake. See the table for a description of all the enemies in Omicron.

If they are not destroyed, bombers become yellow *destroyers.* Destroyers move twice as fast as bombers, and they shoot yellow missiles which are similiar to the ones you fire. Watch destroyers carefully—they can change their direction at the first corner they encounter.

Near the end of the level, the remaining enemies can become orange *battle satellites,* which fire like destroyers, leave bombs like bombers, and bounce around the screen in a furious attack. Needless to say, you should try to kill these off as quickly as possible.

If you wish to pause the game at any time, press SHIFT or SHIFT LOCK. If you use RUN/STOP-RESTORE to break out of the game, you cannot restart play simply by running Program 1 again. Instead, you must turn the computer off and back on, then reload Program 1.

Enemies	Points	Color	Appears as
argon mine	10	cyan	◇
ricochet net	20	green	≡
splinter bomb	50	purple	✶
fusion bomb	100	yellow	F
indestructo	none	yellow	▲
mystery mine	10–100	cyan	?
drifter	200	blue	ʕ
bomber	200	cyan	ʕ
destroyer	400	yellow	ʕ
battle satellite	600	orange	ʕ

See program listings on page 102.

Improvisor

Donald Eddington

Anyone can play melodic music with the help of the 64 and this program. It's fun for children, but adults will enjoy it too.

The Commodore 64 has a powerful sound chip know as the SID (Sound Interface Device). You've probably heard what it can do in games and music programs. "Improvisor" lets you play along with SID to create music without much effort.

Improvisor can play music along with you or play alone. There are three ways to let Improvisor play solo—you can let the computer choose random notes, let it create a song with the program's "intelligence" routine, or let it play from its repertoire of familiar songs. But the best way to enjoy Improviser is to play along with the program. Don't worry if you've never played music before—Improviser will make sure that you sound great.

Typing It In

Improvisor is written entirely in BASIC. Type it in and save a copy to tape or disk. When you're ready to play, load and run the program.

When Improvisor starts, it loads 16 songs from DATA statements. This takes only a few seconds. When it's finished, Improvisor starts playing these songs, one after the other. Listen carefully—you may recognize a few. At the bottom of the screen you'll see the numbers 0–9. The 0 key is a rest, and the other numbers stand for the following notes.

```
R  F  G  A  C  D  F  G  A  C
0  1  2  3  4  5  6  7  8  9
```

Note that this is not a full major scale—the fourth and seventh notes of the scale have been removed. This prevents you from hitting a "bad" note.

THE GRAND IMPROVISOR
TYPE f1 KEY, AND C-64 GOES RANDOM.
TYPE f3 KEY, AND C-64 WILL COMPOSE.
TYPE f5 KEY, AND YOU CAN PLAY ALONG.
TYPE f7 KEY, AND YOU WILL HEAR TUNES.
0 1 2 3 4 5 6 7 8 9

Improvisor *offers a number of options, and you won't sound bad using any of them.*

Now press f1. You'll hear a random, computer-generated melody. This is a good way to get ideas for songs that you want to play on Improvisor.

Press f3 to hear the program's musical "artificial intelligence." The computer does some pattern analysis to determine the next note to play. This results in some very nice melodies. If you want to inspect the intelligence of the program or change it, examine lines 220–320.

Now it's your turn to make music. Press f5. Play notes by pressing keys 1–9. The lowest note is 1 and the highest is 9. For a rest, press 0. All notes are in the key of F. No matter what keys you press, you'll sound great.

You can press a function key at any time—even in the middle of the song—to change between the operating modes.

See program listing on page 106.

S & S Wholesalers, Inc.

WHOLESALE TO THE PUBLIC
BUY BELOW DEALER COST!

1-800-233-6345
ORDERS ONLY

226 Lincoln Road Miami Beach, FL 33139

COMMODORE HARDWARE

C128 Computer	$259.90
C1571 Disk Drive	$239.90
MPS 1200 Printer	$249.90
C1902 Monitor	$288.00
C1350 Mouse	$ 37.90
C1660 300 Baud Modem	$ 49.90
C1670 1200 Baud Modem	$148.90
C64 Computer	$139.90
64C Computer	$ CALL

MONITORS

Samsung 14" Color	$139.90
Samsung Green 12"	$ 49.90
80 Col. Cable	$ 8.77
Monitor Cable	$ 5.77
NEC 12" Color	$134.90

ABACUS

Assembler Monitor	$ 24.99
Basic 128	$ 39.99
Basic 64	$ 24.99
Cadpak 128	$ 39.99
Cadpak 64	$ 27.99
Chartpak 128	$ 27.99
Chartpak 64	$ 24.99
Cobol	$ 27.00
Forth	$ 26.90
Powerplan	$ 26.90
Quick Copy 2.0	$ 14.90
Super C Compiler	$ 39.90
Super Pascal	$ 39.90
T.A.S.	$ 39.90
Video Basic	$ 27.90
XPER	$ 39.90

DISKETTES

Sony DSDD 5¼"	$ 9.97
Memorex DSDD 5¼"	$ 8.97
Precision DSDD 5¼"	$ 7.97
Bonus by Verbatim DSDD 5¼"	$ 6.97
Sony 3½" DSDD	$ 25.50
Sony 3½" SSDD	$ 19.50
Winners 3½" DSDD	$ 24.00

PRINTERS

Okimate 10	$124.77
Okimate 20	$134.77
Plug-N-Print C64	$ 59.77
Plug-N-Print Amiga	$ 69.77
Panasonic 1091	$224.77
Panasonic 1080	$199.77
Star NX 10	$239.77
Star SG10C	$228.77
Okimate 120	$224.77
Epson LX 80	$239.90
Epson FX 85	$369.90
Epson FX 286	$479.90

JOYSTICKS & ACCESSORIES

WICO The Boss	$ 10.77
WICO Ball	$ 14.77
WKO 3 Way	$ 18.77
Kraft	$ 6.77
5¼" Drive Cleaner	$ 6.77
3½" Drive Cleaner	$ 7.77
CRT Cleaner	$ 14.77
C64 Cover	$ 6.77
C128 Cover	$ 7.77
Drive Cover ST	$ 7.77
Printer Head Cleaner	$ 7.77

SOFTWARE CLOSEOUTS

Zork I	$ 4.77
Zork II	$ 4.77
Zork III	$ 4.77
File Now	$ 7.77
Calc Now	$ 7.77
Frogger	$ 7.77
Q Bert	$ 7.77
Popeye	$ 7.77
Multiplan	$ 29.77
Triad	$ 4.77
Battlezone	$ 7.77
Robotron	$ 7.77
Rack-Em Up	$ 6.77

COMMODORE CLOSEOUTS

VIC 1525 Graphics Printer	$ 99.90
MPS 803 Printer	$109.90
C1600 300 Baud Modem	$ 37.90
Commodore Plus/4	$ 79.90

CLOSEOUT

Koala Pad By Koala Technologies	$ 39.77

MASTERTRONIC

Last V8	$ 6.49
5 A Side	$ 6.49
Slugger	$ 6.49
Paul Macartney	$ 6.49
BMX Racer	$ 6.49
Sky Jet	$ 6.49
Line Action Biker	$ 6.49
Skiwriter	$ 11.99
Busicalc 3	$ 11.99
Instant Recall	$ 11.99
• All 3	$ 29.97

ACCESS

Mach 5	$ 22.50
Mach 128	$ 29.90
Leader Board	$ 23.90
Tournament Disk	$ 12.90

TIMEWORKS

Sylvia Porter's Personal Finance	$ 39.90
Data Manager 128	$ 37.77
Swiftcalc 128 w/Sideways	$ 37.77
Wordwriter 128 w/Spell Check	$ 37.77
Partner 128	$ 37.77
All Four	$149.90
Data Manager	$ 27.77
Wordwriter	$ 27.77
SwiftCalc	$ 27.77
All Three	$139.77

EPYX

Championship Wrestling	$ 23.90
Word Games	$ 23.90
Supper Cycle	$ 23.77
Summer Games	$ 23.90
Summer Games II	$ 23.90
Winter Games	$ 23.90
Fast Load	$ 23.90
Multiplan	$ 39.90
World Karate Champ	$ 17.90
Worlds Greatest Baseball	$ 22.90
Koronis Rift	$ 22.90
Eidolon	$ 22.90

ACCOLADE

Ace of Aces	$ 18.90
Dam Busters	$ 17.90
Fight Night	$ 17.90
Hardball	$ 17.90
Law of the West	$ 17.90

MICROPROSE

Acrojet	$ 20.77
F15 Strike Eagle	$ 19.47
Conflict in Vietnam	$ 19.47
Gunship	$ 22.77
Silent Service	$ 24.77

DIGITAL SOLUTIONS

Pocket Writer 64	$ 23.77
Pocket Writer 128	$ 28.77
Pocket Planner 64	$ 23.77
Pocket Planner 128	$ 28.77
Pocket Filer 64	$ 23.77
Pocket Filer 12	$ 28.77

SUBLOGIC

Jet	$ 25.70
Flight Simulator II	$ 31.70
Scenery Disks 1-6	$ 13.70 EA.
Scenery Disk 7-12	$ 13.70 EA.
Scenery Disks 6 Pack	$ 69.70

BRODERBUND

Karateka	$ 17.00
Printshop	$ 25.90
LIB 1/2/3	$ 14.90
Companion	$ 24.90
Bank St. Writer	$ 32.90

SPRINGBOARD

Certificate Maker	$ 29.90
Newsroom	$ 29.00
Clip Art I	$ 18.90
Clip Art II	$ 22.00

AMIGA

Call for Pricing
...IN STOCK...

BATTERIES INCLUDED

Consultant	$ 35.77
Paperclip	$ 35.97
Paperclip w/Spell	$ 47.77

PRECISION

Superbase 64	$ 47.77
Superscript 64	$ 47.77
Superbase 128	$ 52.77
Superscript 128	$ 52.77

ORDERS ONLY
1-800-233-6345

CUSTOMER SERVICE OR IN FLORIDA (305) 538-1364

FREE FREIGHT ON ALL ORDERS WITHIN CONTINENTAL U.S. OVER $100.00

Orders under $100.00 add $4.00 shipping and handling. C.O.D. orders add $4.00.
Prices reflect a 3% cash discount. A.P.O., F.P.O. orders add 6% shipping & handling. Postal orders shipped surface
Add 6% for air shipment. Add 3% for VISA/MC. Florida residents add 5% sales tax. Personal checks allow 2 weeks for processing.
Prices Subject to Change Without Notice.

ORDERS RECEIVED BEFORE 12:00 PM WILL BE SHIPPED SAME DAY.

Lyco Computer

Marketing & Consultants

Since 1981

GREAT BUYS!

Lyco Computer is one of the oldest and most established computer suppliers in America. Because we are dedicated to satisfying every customer, we have earned our reputation as the best in the business. And, our six years of experience in computer mail-order is your assurance of knowledgeable service and quality merchandise.

We fill 95% of all orders every month. Here's how: • lowest prices anywhere • multimillion $ factory fresh inventory • courteous, knowledgeable sales staff • 24-hour shipping on in-stock items

Plus: • free shipping in US on prepaid cash orders • no deposit on C.O.D. orders • no sales tax outside PA • full manufacturers' warranties apply • air freight, UPS Blue/Red shipping available

Call Lyco Computer. See for yourself why so many customers keep coming back to Lyco for the best prices, the most complete inventory, and our fast and courteous service.

To order, call toll-free:
1-800-233-8760
In Penna.: 1-717-494-1030
Customer Service:
1-717-494-1670
Or write:
Lyco Computer, Inc.
P.O. Box 5088
Jersey Shore, PA 17740

MasterCard VISA

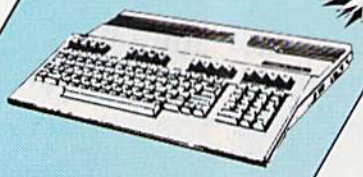
Risk-Free Policy: • prices show 4% cash discount; add 4% for credit cards • APO, FPO, international: add $5 plus 3% for priority mail • 4-week clearance required on personal checks • compatability not guaranteed • return authorization required • we check for credit card theft

System Specials

Complete
COMMODORE 128
System

- Commodore 1902 A monitor
- Commodore 1571 Disk Drive
- Commodore 128 Computer

$759



COMMODORE 64C
System

(90-day warranty)
(reg. $789)

- Commodore 64 C Computer
- 1541 C Drive
- Seikosha SP-1000 VC Printer
- 2 Joysticks

$509

COMMODORE HARDWARE

128 Computer	$275
1571 Disk Drive	$229
64C Computer	$175
1541 C Disk Drive	$185
1902 Monitor	$285
1802C Monitor	$189
C-1700 128K RAM	$109.95
1750 RAM	$169.95
Indus GT C-64 Drive	$179
GEOS	$CALL
C-1351 Mouse	$39

SUPER PRICES ON HARDWARE!

Purchase orders accepted from educational institutions. Also, ask about volume discounts!

1-800-233-8760

Vickie Blaker
Customer Service Department Manager

"Our Customer Service Department is one example of how much Lyco Computer cares about your satisfaction. Everyday we talk to people from all over the world, and our goal with each person who calls is to be as helpful, efficient, and courteous as possible. We're ready to find the answers -- from questions about the status of an order, to warranties, to product availability and price -- or guide you to someone who can. And we're **always** here to help you...before, during, and **after** your purchase."

Diskettes

5-1/4

Maxell:
SSDD.....$9.99
DSDD.....$12.99

Bonus:
SSDD.....$6.99
DSDD.....$7.50

SKC:
SSDD.....$8.50
DSDD.....$9.50
DSHD.....$18.95

Verbatim:
SSDD.....$9.99
DSDD.....$12.99

3.5

3M:
SSDD.....$16.99
DSDD.....$23.99

Maxwell:
SSDD.....$15.99
DSDD.....$21.99

Verbatim:
SSDD.....$16.99
DSDD.....$24.99

SKC:
SSDD.....$14.99
DSDD.....$19.99

COMMODORE SOFTWARE

Timeworks:
Data Manager.....$42.95
Swiftcalc.....$42.95
Wordwriter.....$42.95
Accounts Payable.....$38.95
Accounts Receivable.....$38.95
General Ledger.....$38.95
Inventory.....$38.95
Payroll.....$38.95

Batteries Included:
Consultant.....$32.95
Paperclip w/Spellpack.....$48.95
Paperclip II.....$NEW

Springboard:
Newsroom.....$32.75
Clip Art I.....$18.75
Clip Art II.....$24.75

Epyx:
Destroyer.....$24.75
Fastload.....$24.75
Football.....$24.75
Karate Champ.....$20.75
Movie Monster.....$24.75
Multiplan.....$24.75
Summer Games II.....$24.75
Super Cycle.....$24.75
Vorpol Utility Kit.....$15.75
Winter Games.....$24.75
World Games.....$24.75

Unison:
Art Gallery 1 or 2.....$15.95
Print Master.....$22.95

Sublogic:
Flight Simulator II.....$31.95
Jet Simulator.....$31.95
Night Mission Pinball.....$21.95
Scenery Disk.....$17.95
Sublogic Baseball.....$31.95
Sublogic Football.....$25.95

Strategic Simulations:
Baseball Stadium.....
Gemstone Healer.....
Gettysburg.....
Kampfgruppe.....
Phantasie II.....
Ring of Zelfin.....
Road War 2000.....
Shard of Spring.....$
Wizards Crown.....$2
War in the South Pacific.....$39.
Wargame Construction Set.....$21.

Broderbu
Bank St. Wr
Carmen San D
Champion Lode
Graphic Library I,
Karateka.....
Print Shop.....
Print Shop Companion
Print Shop Paper.....
Science Kit.....

Firebird:
Colossus IV.....
Elite.....

Unison World:
Art Gallery 2.....
Print Master.....

Access:
- Leader Board $24.95
- Mach 5 ..... $23.95
- Mach -128 ..... $29.95
- 10th Frame $24.95
- Executive Tournament $13.95
- Tournament #1 ..... $13.95
- Triple Pack $14.95

Activision:
- Aliens $24.75
- Championship Basketball $22.75
- Hacker $18.75
- Hacker 2 ..... $20.75
- Labyrinth $22.75
- Little People $20.75

Firebird:
- Colossus IV $21.95
- Elite $19.95
- Frankie Goes to Italy $19.95
- Pawn $28.95
- Talking Teacher $28.95
- Traker $31.95

Hi Tech Expressions:
- Heart Ware $6.75
- Holiday Paper $8.95
- Card Ware $6.75
- Party Ware $9.75
- Ware With All $11.75

Music Studio $22.75
Portal $26.95
Tass Times $22.75
Titanic ..... $NEW

Microprose:
- Acrojet $19.95
- F-15 Strike Eagle $21.95
- Gunship $22.95
- Kennedy Approach $19.95
- Silent Service $22.95
- Solo Flight $19.95
- Top Gunner $19.95

Microleague:
- cro League Baseball $24.95
- eral Manager $24.95
- sk $15.95
- m Disk $13.95
- gue Wrestling ..... $NEW

d:
- r 128K $32.75
- ego $22.75
- lunner $24.75
- or III $15.75
- $18.75
- $25.75
- $22.75
- $12.75
- $35.75

- $16.95
- $18.95
- $36.95
- $36.95
- $24.95
- $24.95
- $24.95
- 4.95
- 95

Sublogic:
- Flight Simulator II $32.95
- Jet Simulator $25.95
- Night Mission Pinball $22.95
- enery #1 - #6 ..... $69.95

x:
- yer $23.95
- Champ $23.95
- nster $23.95
- es $23.95
- $23.95
- $23.95

- $25.95
- $22.95

- $19.95
- $25.95

Apple SOFTWARE

Access:
- Triple Pack $14.95

Activision:
- Enchanter Trilogy $49.75
- Game Maker $31.75
- Leather Goddesses $25.75
- Term Paper $35.75
- Championship Basketball $26.95
- Championship Golf ..... $New

Microprose:
- Crusade in Europe $24.95
- Decision in Desert $24.95
- F-15 Strike Eagle $22.95
- Silent Service $22.95

Microleague:
- Micro League Baseball $25.95
- General Manager $25.95
- Stat Disk $16.95
- '86 Team Disk $14.95

Broderbund:
- Airheart $22.75
- Ancient Art of War $25.75
- Print Shop $30.75
- Print Shop Companion $25.75
- Carmen San Diego (USA) $28.75
- On Balance $62.75
- Bank St. Writer (128K) $43.75

Strategic Simulations:
- Battlegruppe $38.95
- Colonial Conquest $25.95
- Gettysburg $35.95
- Phantasie II $25.95
- Shard of Spring $25.95
- Wizards Crown $25.95

Epyx:
- Apshai Trilogy $22.95
- Rogue $22.95
- Winter Games $22.95

Firebird:
- Pawn $28.95

Unison World:
- Print Master $24.95
- Art Gallery 1 or 2 ..... $18.95

VIP:
- VIP Professional $115

IBM SOFTWARE

Activision:
- Pebble Beach $32.95
- Portal $28.95
- Championship Basketball $26.95
- Ballyhoo $25.75
- Enchanter Trilogy $49.75
- Leather Goddesses $25.75
- Moonmist $25.75
- Music Studio $32.75

Microprose:
- Conflict in Vietnam $25.75
- Crusade in Europe $25.75
- Decision in Desert $25.75
- F-15 Strike Eagle $21.75
- Silent Service $21.75

Microleague:
- Micro League Baseball $25.95
- General Manager $25.95
- Stat Disk $16.95
- '86 Team Disk $14.95

AMIGA SOFTWARE

Access:
- Leader Board $24.95
- Portal $28.75
- Tournament #1 ..... $14.95

Activision:
- Borrowed Time $26.95
- Championship Basketball $26.95
- Championship Golf $32.95
- Hacker $26.95
- Hacker 2 ..... $29.95
- Little People $29.95
- Mindshadow $26.95
- Music Studio $35.95
- Tass Times $26.95

Strategic Simulations:
- Computer Baseball $24.95

Sublogic:
- Flight Simulator II $32.95
- Jet Simulator ..... $CALL

Epyx:
- Apshai Trilogy $24.75
- Destroyer $24.75
- Karate Champ $19.75
- Movie Monster $24.75
- Rogue $19.75
- Winter Games $24.75
- World Games $24.75

Strategic Simulations:
- Battle of Antetiem $38.75
- Computer Baseball $14.95
- Gettysburg $38.75
- Knights in Desert $25.75
- Shard of Spring $25.75

Sublogic:
- Jet Simulator $34.75
- Scenery Japan $15.95
- Scenery San Francisco $15.95
- Scenery #1 - #6 ..... $69.95

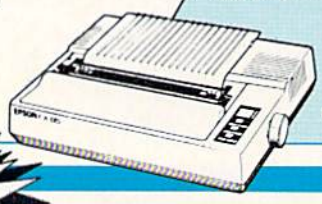
Broderbund:
- Ancient Art of War $28.95
- Print Shop $37.75
- Print Shop Companion $31.75
- Graphic Library I or II $21.75
- Karateka $21.75
- Toy Shop $39.95
- Bank St. Writer $49.95

Unison World:
- Art Gallery 2 ..... $18.95
- News Master $55.75
- Print Master $36.75

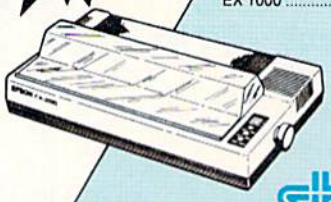
We stock over 5000 titles of software. If it's not listed, call for price and availability!

PRINTERS

Seikosha SP1000VC $154
Seikosha SP1200Ai $205
Panasonic 1080i $195
Star NX-10 ..... $199
Star NP-10 ..... $169
Citizen 120-D $179



GREAT DEALS ON PRINTERS!



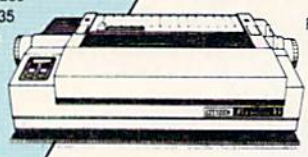
Panasonic

1091i $269
1092i $335
1592 ..... $399
1595 ..... $499
3131 ..... $249
3151 ..... $399
1080 APIIc $239

EPSON

LX 86 ..... $209
FX 85 ..... $355
EX 800 ..... $449
EX 1000 ..... $579
FX 286 ..... $479
LQ 800 ..... $449
LQ 1000 ..... $659
FX 86E ..... $CALL
FX 286E ..... $CALL

CITIZEN



Premiere 35 ..... $469
MSP-10 ..... $285
MSP-15 ..... $385
MSP-20 ..... $325
MSP-25 ..... $485

SEIKOSHA

SP 1000AP IIc $199
SP 1200Ai IBM $215
SP 1200ASi R5232 ..... $215
SP 180VC $159
SP 180Ai $165
SL-80Ai $375
MP 1300Ai $439
MP 5300Ai $579
BP 5420Ai $1099
1300 Color Kit $119
BP-5420 Ribbon $12.50
SP-1000 Ribbon $8.50

star micronics inc

NX-10C $209
NL-10 ..... $229
NX-15 ..... $329
NB-15 ..... $949
SD-10 ..... $265
SD-15 ..... $438
SR-10 ..... $469
SR-15 ..... $535
NB24-15 ..... $729
ND-15 ..... $445
NR-15 ..... $529

Toshiba

321 P/S $479
P341PE $729
P341S $699
P351E ..... $CALL

DIABLO

D25 ..... $519
635 ..... $799
D-80 IF $2395

OKIDATA

an OKI AMERICA company

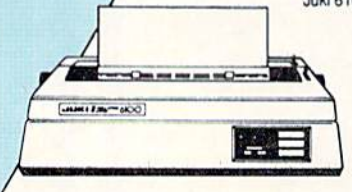
Okimate 20 ST $189
120 NLQ $225
292 ..... $449
293 ..... $599
182 ..... $214
192 + ... $365
193 + ... $559

LEGEND

808 ..... $159
1080 ..... $199
1380 ..... $229
1385 ..... $289

JUKI

R5232 serial board $55
Juki 6300 ..... $739
Juki 6100 ..... $399



SILVER REED

EXP 420P $209
EXP 600P $539
EXP 800P $719

Modems

SPECIAL PRICE

Avatex
1200hc $119
1200 ..... $89
Zoom
PC 1200 ST (internal) $189
PC 1200 XL (internal) $259
PC 2400 ST (internal) $329
PC 2400 XL (internal) $349
Hayes
Smartmodem 300 ..... $133
Smartmodem 1200 ..... $377
Smartmodem 1200B $347
Smartmodem 2400 ..... $598
Micromodem IIe ..... $CALL
Smart 300 Apple IIc ..... $CALL
Anchor
Volksmodem 12 ..... $135
Commodore
1670 ..... $129
Supra
1064 Modem $49.95
Supra 300 ..... $39.95
Supra 1200 ..... $149.95
Atari
XM-301 ..... $35

Monitors

Teknika
MJ-22 ..... $249
MJ-305 ..... $309
MJ-503 ..... $529
Zenith
ZVM 1220 ..... $89
ZVM 1230 ..... $89
ZVM 1240 ..... $139
ZVM 1350 ..... $385
Hitachi
MM-1218 12" Green $99
MM-1220 12" TTL Amber $129
CM-1216 D 12" RGB $385
CM-1455 S 13" $525
CM-1457 A 13" RGB $679
Thomson
365 12 RGB ..... $CALL
Monochrome from $89
Panasonic
TR-122 MYP 12" Amber TTL $139
TR-122 M9P 12" Green TTL $139
Commodore
1902 Color $289
1802 C $215
NEC
Multisync ..... $CALL
Princeton Graphics
MAX-12 Amber $175
HV-12 RGB $458
SR-12 RGB $575

We stock interfacing for Atari, Commodore, Apple and IBM

Skidders

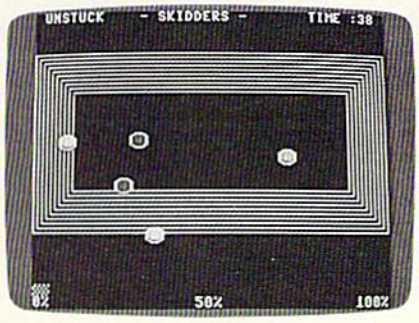
I. J. Lyles, Jr.

This arcade game for the 128 demands the quickest of reflexes. A joystick is required.

You are one of five skidders stuck in a closed universe. All five of you have tried to find a way out, but with no luck—go off the screen in any direction and you wrap around to the opposite edge. The enclosure has driven your friends mad—they fly around the screen at high speed in a desperate attempt to leave your universe and find one where someone is doing something more interesting. Stay away from them—at their speed, a single touch will destroy you.

"Skidders" is a game programmed entirely in BASIC for the 128. BASIC 7.0 provides so many useful sprite-movement and collision-detection features that games requiring machine language on the 64 can often be done in BASIC on the 128.

Type in the program and save a copy to tape or disk before attempting to run the program. To play Skidders, load the program and type RUN.



The player (the blue skidder) must act quickly to avoid a deadly collision.

Skidding For Your Life

Use a joystick plugged into port 2 to control your skidder. You are the light blue one lying in the center of the screen. Don't stay still for too long, though—you've got to dodge the other skidders, which come from every direction and move faster and faster as the game goes on.

Don't get hit even once—if you do, you'll lose. To win the game (and it's not easy), you must last 40 seconds. There is a countdown timer in the screen's upper right corner that displays exactly how many seconds you have left. The time is also graphically displayed at the bottom of the screen in the form of a bar graph. You start at 0 percent of time completed. When you reach 100 percent of time completed, 40 seconds will have passed, and you will have won.

There is a yellow wall surrounding the playing field. This border is not impenetrable, but it does slow you down. You can wend your way through: The top wraps around to the bottom and vice versa. The same is true of the left and right edges. If you find yourself caught in the wall, move off of it as quickly as possible. Your fellow skidders hold so much energy that they're unaffected by the wall—they'll come streaming through while your movement is hampered. It's a very hazardous place to visit.

See program listing on page 101.

Introducing a new printer that's based on an old favorite.

The new Star Gemini II.
The printer that was made for your Commodore PC.

We took all the best features from our original Gemini,® our best-selling printer for Commodore® users.

Then we added enhanced Near Letter Quality printing…a built-in Commodore interface (with cable included)…a rear tractor feed…and an array of front panel controls that makes printing easier than ever.

The result? The new Star Gemini II. A printer designed to help your Commodore's performance. Without hurting your budget.

Now at Toys 'R' Us and other major chain stores.

In front with quality up front.

star® micronics

The new Star Gemini II.

® *Commodore is a registered trademark of Commodore Business Machines, Inc.*

PROTECTO
ENTERPRIZES
"The Computer Experts"

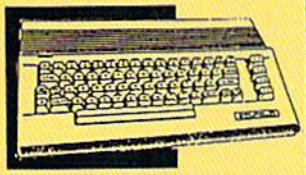
22292 N. Pepper Rd., Barrington IL 60010

• OUR WARRANTY •

All our products carry a minimum 90 day warranty from the date of purchase. If problems arise, simply send your product to us via U.P.S. prepaid. We will IMMEDIATELY send you a replacement at no charge via U.P.S. prepaid. This proves once again that...

We Love Our Customers!

COMMODORE 64c



Includes the GEOS program.

SALE $ 159.95

List $299

BLUE CHIP DISK DRIVE

SALE $ 159.95

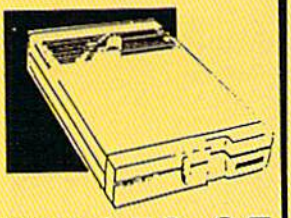
List $249

COMMODORE 128

SALE $ 289.00

List $399

1571 DISK DRIVE



SALE $ 259.95

List $349

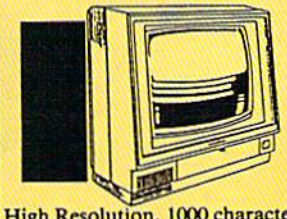
TV TUNER

Now switch your computer monitor into a television set with the flick of a switch.This Tuner has dual UHF/VHF selector switches, mute, automatic fine tuning and computer/TV selector switches. Hooks up between your computer and monitor! Inputs included for 300 ohm, 75 ohm, and UHF.

SALE $ 79.95

List $130

13" COLOR MONITOR



High Resolution, 1000 character display, with built in audio speaker with volume control.

SALE $ 179.95

List $329

BIG BLUE PRINTER

This is the affordable printer you've waited for! 8½" letter size, 80 column dot matrix, heat transfer printer features upper and lower case, underline, graphics, word processing, and much more.

SALE $ 39.95

List $199

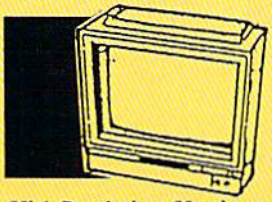
PRINTER & TYPEWRITER COMBINATION

Superb Silver Reed letter quality daisy wheel printer/typewriter, just a flick of the switch to interchange. Extra large carriage, typewriter keyboard, automatic margin control, compact, lightweight, drop in cassette ribbon! Includes Centronics Parallel Interface

SALE $ 179.95

List $299

14" RGB & COMPOSITE COLOR MONITOR

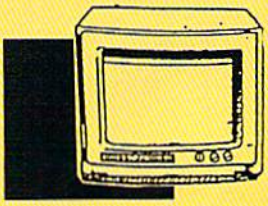


High Resolution, 80 column Monitor. Switch from RGB to Composite. (C128 - IBM -Apple) RGB cable $19.95. Add $14.50 shipping.

SALE $ 237.00

List $399

12" 80 COLUMN MONITOR

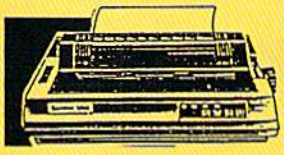


High Resolution amber or green screen monitor. 80 col. x 1000 lines at center. Non-glare screen. Works terrific with IBM, Apple and Laser business computers.

SALE $ 99.00

List $129

COMSTAR 1000 PRINTER



Print letters, documents, etc., at 100 cps. Works in Near Letter Quality mode. Features are dot addressable graphics, adjustable tractor and friction feed, margin settings, pica, elite, condensed, italics, super/subscript, underline, & more. CBM Interface Included.

SALE $ 179.95

List $349

160-180 CPS N.L.Q. 180 PRINTER

This printer has a Near Letter Quality button on the front panel. No more turning the printer on and off. The 8K buffer will free up your computer four times faster than conventional printers and the high speed will keep you computing more than printing. Super graphics along with Pica, Elite, Italics, and Condensed print. **Lifetime Warranty** on Print Head plus 6 month immediate replacement warranty.

SALE $ 199.00

List $499

MasterCard

TO ORDER CALL (312) 382-5244

8 am - 8 pm CST Weekdays / 9 am - 12 noon CST Saturdays

VISA

BEST SERVICE IN THE USA • 1 DAY EXPRESS MAIL • OVER 1000 PROGRAMS • VOLUME DISCOUNTS • 15 DAY FREE TRIAL • CUSTOMER LIST OF OVER 3,000,000 - LARGEST IN THE USA

FOR FREE CATALOG CALL

(312) 382-5244

CALL BEFORE YOU ORDER: PRICES MAY BE LOWER & WE OFFER SPECIAL SYSTEM DEALS

MUSICAL KEYBOARD

This sturdy 40 key professional guage spring loaded keyboard gives the feel and response of a real keyboard instrument. (Conductor software required)

SALE $69.00

List $159.95

1200 BAUD MODEM

Save time and money with this 1200 Baud modem. It has many features you expect a modem to have plus 4 times the speed!

SALE $79.95

List $199

COMPUTER CLEANERS

TV/Monitor Screen Restorer & Cleaning Kit, Disk Drive Cleaner, Anti-Static Keyboard Cleaner

*Choose any of these three computer cleaners for only $9.95 each!

SALE $9.95*

List $19.95

SUPER AUTO DIAL MODEM

300 Baud Modem has on-line clock, dialing from keyboard, capture and display high resolution characters, and more.

SALE $29.95

List $99

SINGLE SIDED DOUBLE DENSITY DISKS

100% Certified 5¼" floppy disks. **Lifetime Warranty.** 1 Box of 100 $29.00 List $1.99 each

.29¢ ea.

SPECIAL BONUS COUPON

We pack a special software discount coupon with every Computer, Disk Drive, Printer, or Monitor we sell! This coupon allows you to **SAVE OVER $250** off sale prices!

(EXAMPLES)

Name	List	Sale	Coupon
Transformers	$34.95	$22.95	*$21.95*
Trio C128	$69.95	$42.95	*$39.95*
Indoor Sports	$29.95	$19.95	*$18.95*
Championship Basketball	$34.95	$22.95	*$21.95*
Leader Board	$39.95	$23.95	*$21.95*
Tales of Me	$39.95	$16.95	*$14.95*
Monitor Stand	$79.95	$19.95	*$16.95*
Marble Madness	$24.95	$22.95	*$19.95*
Super Bowl Sunday	$35.00	$20.95	*$18.95*
SAT Sample Test	$39.95	$14.95	*$12.95*
Commando	$34.95	$22.95	*$21.95*
Auto Duel	$42.95	$32.95	*$29.95*
Flight Control Joystick	$19.95	$12.95	*$10.00*
Robotics Workshop	$149.00	$119.95	*$114.95*
C128 Troubleshooting & Repair Guide	$19.00	$14.95	*$12.95*

(See over 100 coupon items in our catalog.)

COMMODORE SOFTWARE

ACCESS

ACTION PACK (D)	$19.95
LEADER BOARD (D)	23.95
LEADER BOARD COURSES (D)	13.95
MACH 5 (C)	19.95
MACH 128 (C)	28.95
TENTH FRAME (D)	23.95

ACCOLADE

ACE OF ACES (D)	$18.95
DAM BUSTERS (D)	18.95
FIGHT NIGHT (D)	18.95
HARDBALL (D)	18.95
LAW OF THE WEST (D)	18.95
KILLED UNTIL DEAD (D)	18.95

BLUE CHIP

BARON (D)	$14.95
MILLIONAIRE (D)	14.95
TYCOON (D)	14.95

BCI

TOM WEISKOPF PRO GOLF (D)	$11.95
VIDEO PHILE (D)	14.95
PRINTERS LIB. 1 (D)	8.95
PRINTERS LIB. 2 (D)	8.95
DATABASE MGR./PLUS - C128 (D)	14.95
MIND OVER MATTER (D)	8.95

BRODERBUND

PRINT SHOP (D)	$25.95
GRAPHICS LIB. 1,2 or 3 (D)	15.95
COMPANION (D)	22.95
TOY SHOP (D)	38.95
WHERE IS CARMEN SANDIEGO (D)	21.95
GRAPHICS LIB. HOLIDAY ED. (D)	15.95

ELECTRONIC ARTS

HEART OF AFRICA (D)	$9.95
ONE ON ONE (D)	9.95
PINBALL CONTRUCTION (D)	9.95
MUSIC CONSTRUCTION (D)	9.95
RACING DESTRUCTION (D)	9.95
MARBLE MADNESS (D)	22.95
STAR FLEET 1 (D)	25.95
BALKON RAIDER (D)	22.95
QUIZAM (D)	22.95

DATA SOFT

221 B BAKER STREET (D)	$17.95
MERCENARY (D)	17.95
NEVER ENDING STORY (D)	17.95
MIND PURSUIT (D)	17.95
VIDEO TITLE SHOP (D)	17.95
THEATRE EUROPE (D)	19.95

DESIGNWARE

BODY TRANSPARENT (D)	$24.95
EUROPEAN NATIONS & LOCATIONS (D)	22.95
STATES AND TRAITS (D)	22.95

HAYDEN

SARGON II (D)	$9.95
SAT VERBAL (D)	14.95
SAT MATH (D)	14.95
SAT PRATICE TEST (D)	14.95

COSMI

SUPER HUEY II (D)	$12.95
TALLADEGA (D)	10.95
BEYOND FORBIDDEN FOREST (D)	10.95

DATA EAST

COMMANDO (D)	$22.95
KARATE CHAMP (D)	22.95
KUNG FU MASTER (D)	22.95

EPYX

CHAMPIONSHIP WRESTLING (D)	$22.95
DESTROYER (D)	22.95
MOVIE MONSTER (D)	22.95
WINTER GAMES (D)	22.95
WORLD GAMES (D)	22.95
WORLD KARATE (D)	16.95
WORLD'S GREATEST FOOTBALL (D)	22.95

ARTWORK

BEACH BLANKET VOLLEYBALL (D)	$9.95
EQUESTRIAN SHOWJUMPER (D)	9.95
HIGHLAND GAMES (D)	9.95
POLICE CADET (D)	9.95
THAI BOXING (D)	9.95
BRIDGE 4.0 (D)	16.95

HI-TECH EXPRESSIONS

CARD WARE (D)	$6.95
HEART WARE (D)	9.95
PARTY WARE(D)	9.95
WARE WITH ALL KIT (D)	9.95
HOLIDAY PRINT PAPER (D)	7.95

SUB—LOGIC

FLIGHT SIMULATOR II (D)	$31.95
JET (D)	25.95
FOOTBALL (D)	25.95
BASEBALL (D)	31.95

S.S.I.

ROADWAR 2000 (D)	$23.95
BATTLE OF ANTIETAM (D)	31.95
GETTYSBURG (D)	32.95
WAR IN SOUTH PACIFIC (D)	32.95
NAM (D)	23.95
U.S.A.A.F. (D)	32.95
KAMPFGRUPPE (D)	32.95
WAR SHIP (D)	32.95

SOFTSYNC

ACCOUNTANT, INC. C128 (D)	$59.95
DESK MANAGER (D)	24.95
KID PRO QUO (D)	19.95
MODEL DIET (D)	19.95
TRIO C64 (D)	29.95

SPINNAKER

DELTA DRAWING (C)	$9.95
NUMBER TUMBLERS (C)	9.95
SEA SPELLER (C)	9.95
UP & ADD'EM (C)	9.95

Add $3.00 ($10.00 for hardware) for shipping, handling, and insurance. Illinois residents please add 6⅛ % sales tax. Add $6.00 ($20.00 for hardware) for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. All orders must be in U.S. Dollars. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA. Enclose Cashier Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail. Prices & Availability subject to change without notice. Hardware shipping prices vary according to weight. Please call for amount. No APO-FPO for Monitors. C.O.D. on phone orders only.

VISA-MASTER CARD-C.O.D.

Tass Times In Tonetown

From the *Tonetown Times* comes the following startling announcement:

Erstwhile Tonetown eyesore Jonboi Waltune, cited for aggravated tonelessness, left town quietly last night. Sore-eyed locals did not regret his departure.

"He just couldn't get a take on what's tass," said celebrated bodystylist Chaz, "no matter what he did. He wore the most untone shirts with ugly little emblems on them and blue scrub pants with someone else's name on one hip pocket."

For anyone about to visit Activision's *Tass Times in Tonetown*, the fate of poor Jonboi should serve as a warning. It is possible to commit many crimes in this strangest of worlds, but none is as major as simply being untass. In fact, your very survival depends on how well you alter your appearance, with a new pink hairstyle and a set of TroppoWear duds from Down Under, to convince the locals that you understand the meaning—and the importance—of the word *tone*. Fail at this, and you fail before you begin.

Fail at what? you ask. Why, at rescuing Gramps, of course. See, at some point during the last couple of days, Gramps, in whose living room you begin this adventure, has disappeared through a magic hoop, leaving behind nothing but a cryptic journal and some well-aged pizza. Because you want to find the guy, you decide to follow him through the hoop, and you end up in this really weird (but extremely tass) world. Tonetown, it's called—a place that is really, unquestionably, well ...different. Different from what? Everything, as it turns out.

It turns out, too, that Gramps knew about the place and visited it often. And so did his dog, who now accompanies you everywhere. Turns out as well that the dog—whose Tonetown name is Ennio—is more than just any ordinary mongrel. He's known here as The Legend, a six-time winner of the Inter-Moonal Ultra Journalism Award. He's helpful, and your association with him will get you into several very tass places.

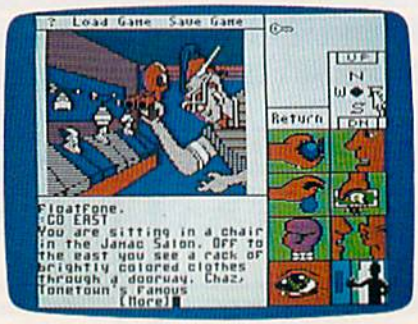
He can get you into Fast Freddie's for some ultratouch eats and tone tunes, and he can even get you backstage at a Daglets concert. He can also help you get a job with the *Tonetown Times*. What he won't willingly do, though, is take you to Franklin Snarl's pet store, because Snarl keeps some fairly disgusting pets in there. They're called blobpets, and even though they're all the rage in Tonetown these days, they're far from wonderful. Snarl, it seems, not only sells them, but also makes them.

Snarl is a snake. Literally. If you don't become tass, he'll kill you. Even if you do become tass, and then try to interfere with a couple of his business dealings, he'll kill you anyway. Franklin Snarl is the bad guy of this story, and rumor has it he is the one behind Gramps' disappearance. Guarding his hideaway, though, is this nose and this pair of eyes, and....

Tonetown is a cross between Alice's Wonderland, with its emphasis on strange language and weird creatures, and an episode of "The Monkees" TV show, with its overstated villains and its humorous attempts at being hip.

Clearly a crazy game, *Tass Times in Tonetown* is a thoroughly delightful change of pace. A graphics-and-text adventure in the manner of Activision's earlier *Borrowed Time*, *Tass Times* shares *Borrowed Time*'s good features—a clever interface and good, fun graphics—while dispensing, except at the beginning, with the earlier game's tendency to kill you off every time you turn around. In other words, *Tass Times* is a successful and enjoyable extension of the *Borrowed Time* system, going beyond that to provide a truly interesting and funny setting.

For recent text adventures, setting has become more important than plot. Exceptions such as Infocom's *Starcross*

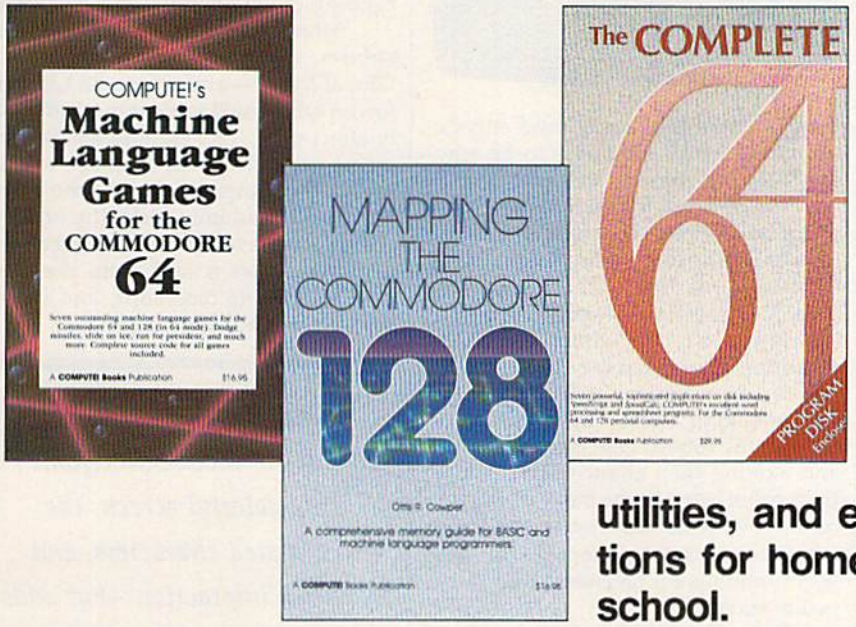

? Load Game Save Game
Return
FigatFone.
>GO EAST
You are sitting in a chair in the Jamac Salon. Off to the east you see a rack of brightly colored clothes through a doorway. Chaz, Tonetown's famous
[More]

notwithstanding, early adventures offered little in the way of fully imaginable worlds. In the past 18 months or so, this has changed. Authors seem much more concerned with offering players an interesting world to operate in, and with this new emphasis have come the best adventures to date. *Mindwheel* and *Brimstone* (Brøderbund-Synapse), and *A Mind Forever Voyaging* and *Trinity* (Infocom) demonstrate that a clearly presented, fascinating setting will do much to enhance an adventure's enjoyment. *Tass Times in Tonetown*, with a world filled with strange (but recognizable) characters speaking a strange (but recognizable) language, now joins the ranks of these other fine adventures.

Entering Tonetown is a little like entering a dream in which you never quite feel comfortable. Tonetown is a cross between Alice's Wonderland, with its emphasis on strange language and weird creatures, and an episode of "The Monkees" TV show, with its overstated villains and its humorous attempts at being hip. Still, I wish the designers had gone even further, demanding that we learn to talk tass in order to get things done, and maybe doing something like forcing us to rethink such concepts as parks, boats, and even directions. Tonetown would allow this kind of dream-like distortion, but all too little of it happens.

But the game is fun, and that's really all that counts. The parser works just fine, and after a little practice you can avoid dying in the first few moves. The interface eases play and gets rid of much of the frustration of other adventures. All this is good, but somehow, in a game set in such a unique world, it doesn't seem to matter. Here is an adventure in which traveling around,

Calling All COMMODORE Users!


COMPUTE!'s
Machine Language Games for the COMMODORE 64
A COMPUTE! Books Publication
MAPPING THE COMMODORE 128
Ottis R. Cowper
A comprehensive memory guide for BASIC and machine language programmers
A COMPUTE! Books Publication
The COMPLETE 64
PROGRAM DISK
A COMPUTE! Books Publication

Three new books from COMPUTE! bring you fully tested and completely documented machine language programming tutorials, exciting games, valuable utilities, and easy-to-use applications for home, business, and school.

Exceptional new books from COMPUTE! for your 64 and 128.

Mapping the Commodore 128
Ottis R. Cowper
This clearly written, comprehensive memory map and programmer's guide, written by the technical editor of COMPUTE! Publications, provides a detailed explanation of the inner workings of the Commodore 128 computer. Topics include memory management, BASIC 7.0, I/O chip registers, the operating system, system RAM, and much more. This is an important reference for both BASIC and machine language programmers.
$19.95 ISBN 0-87455-060-2

COMPUTE!'s Machine Language Games for the Commodore 64
Edited
This collection of the best machine language games from *COMPUTE!* magazine and *COMPUTE!'s Gazette* is a must for 64 game players and machine language programmers. The book includes both the source code (studying these listings is an excellent way to improve your machine language programming) and object code for the popular games "Cut-off!," "Campaign Manager," "Nessie," "Miami Ice," "Heat Seeker," "Whirlybird," and "Laser Beam." *A disk is available for $12.95 which includes programs in the book, 610BDSK.*
$16.95 ISBN 0-87455-061-0

The Complete 64
Edited
A book/disk combination with seven powerful, sophisticated applications on disk. The book has complete, easy-to-follow documentation for each of the six applications. It features *SpeedScript* and *SpeedCalc*, COMPUTE!'s commercial-quality word processing and spreadsheet programs; "Plus/Term," an easy-to-use, yet versatile, telecommunications program; and "Sidplayer," a powerful music editor and player. "Hi-Resolution Sketchpad," "Ultra-Font +," and "Mini-filer" are also included. All the applications are on a disk ready to load and use on the Commodore 64 and 128 running in 64 mode.
$29.95 for book/disk package
ISBN 0-87455-062-9

Visit your local book or computer store and ask for one of these new summer releases from COMPUTE! Books.

You can order directly from COMPUTE! by calling toll-free 800-346-6767 (in NY 212-887-8525) or writing COMPUTE! Books, P.O. Box 5038, F.D.R. Station, New York, NY 10150.

Please include $2.00 per book or disk for shipping and handling in U.S. and surface mail or $5.00 per book airmail. NC residents add 5 percent sales tax. NY residents add 8.25 percent sales tax.

Please allow 4–6 weeks for delivery.

COMPUTE! Publications, Inc. abc
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies
825 7th Avenue, 6th Floor, New York, NY 10019
Publishers of COMPUTE! COMPUTE!'s Gazette, COMPUTE!'s Gazette Disk, COMPUTE! Books, COMPUTE!'s Apple Applications, and COMPUTE!'s Atari ST Disk and Magazine

COMPUTE! books are available in Canada from McGraw-Hill, Ryerson Ltd., 330 Progress Ave., Scarborough, Ontario, Canada M1P 2Z5.

visiting the tone spots and listening to the really tass talk, is as enjoyable as trying to solve the plot. If you want something different, try a visit to Tonetown. I guarantee you that wherever else you travel in adventureland, you won't find a place exactly like it.

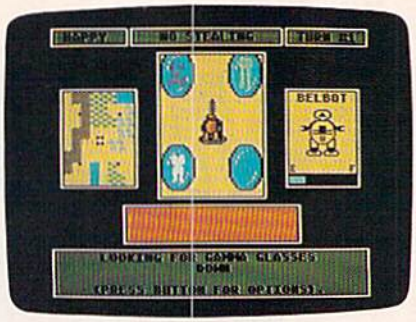
—Neil Randall

Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
$34.95

Robot Rascals

This new program from Electronic Arts is great fun. It takes the challenge of computer play and broadens it to encompass the fun and interaction of a family board game. As a multiplayer game, it provides an opportunity for good-natured competition that requires shrewd strategy and an instinct for revenge. In addition, the antics of the rascally robots delight and entertain throughout the game.

The program, written for the Commodore 64, comes with an easy-to-grasp, witty manual that contains both directions for play and advice on strategy. Two decks of cards are included: Luck cards, which are drawn during game play, and Item cards, which are



dealt out, four to a player, randomly determining which items are to be scavenged by the players' robots.

The object is for each player to use his or her robot to seek out and collect (scavenge) the four items designated by the Item cards. These items are on the planet Laustenfownd—yes, that's what it's called—a place whose geography includes lakes, rock-ridden fields, woods, open plains, and swampland. The changing terrain has varying effects on the robots, affecting their speed and altering their chances for damage. Each robot has a home base to which to return—with its scavenged goods, for repairs, or for safety. There are five teleport terminals on Laustenfownd to expedite travel.

Robot Rascals has four levels of play to choose from: superbeginner, beginner, standard, and advanced. Difficulty is determined by the setup (how the two decks of cards are used) and by the play level selected. After you set up, the computer helps the players choose their robots from the ten provided. Each player selects a color for his robot and a beginning energy level. This allows for both strategy and, later, handicapping among experts and beginners.

After the players have chosen their robots, the computer announces a Global Event—a condition on Laustenfownd which will favorably or adversely affect play. (At beginner levels there are no negative global events.) For each round, the computer changes the global event and randomly picks the order in which players take turns. During a turn, a player draws a card from the Luck pile, follows its directions, and moves his or her robot via the joystick.

Robot Rascals...*retains the wonder of a computer game—the colorful screen, the animated characters, and joystick interaction—but adds the traditional camaraderie and interplay of a family board or card game....*

The combined effects of the Luck cards, Item cards, global events, and individual player strategy allow for intriguing play. Theft, energy depletion, getting stuck with items that drain a robot's capabilities, and being teleported to another point on the planet can all be unfortunate mishaps.

The skillful combination of these varying elements is what makes *Robot Rascals* such a great game. It retains the wonder of a computer game—the colorful screen, the animated characters, and joystick interaction—but adds the traditional camaraderie and interplay of a family board or card game—the wisecracks, laughter, and unheeded pleas for mercy as someone succeeds in "getting even." This is a game that can come to the party, entertain a group, and bring the family together for some fun. In *Robot Rascals*, Electronic Arts has brought the computer game out of the study and placed it in the heart of the family room. And that's where the best games belong.

—David and Robin Minnick

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
$39.95

COPY II® 64/128

BACKUP PROTECTED SOFTWARE FAST.

From the team who brought you Copy II Plus (Apple), Copy II PC (IBM) and Copy II Mac (Macintosh) comes a revolutionary new copy program for the Commodore 64/128 computers.

- Copies many protected programs—automatically. (We update Copy II 64/128 regularly to handle new protections; you as a registered owner may update at any time for $15 plus $3 s/h.)
- Copies even protected disks in under 2 minutes (single drive).
- Copies even protected disks in under 1 minute (dual drive).
- Maximum of four disk swaps on a single drive.
- Includes fast loader, 12-second format.

Requires a Commodore 64 or 128 computer with one or two 1541 or 1571 drives.

Call 503/244-5782, M—F, 8—5 (West Coast time) with your VISA in hand. Or send a check for $39.95 U.S. plus $3 s/h, $8 overseas.

$39.95

Central Point Software, Inc.
9700 S.W. Capitol Hwy. #100
Portland, OR 97219

Central Point Software INCORPORATED

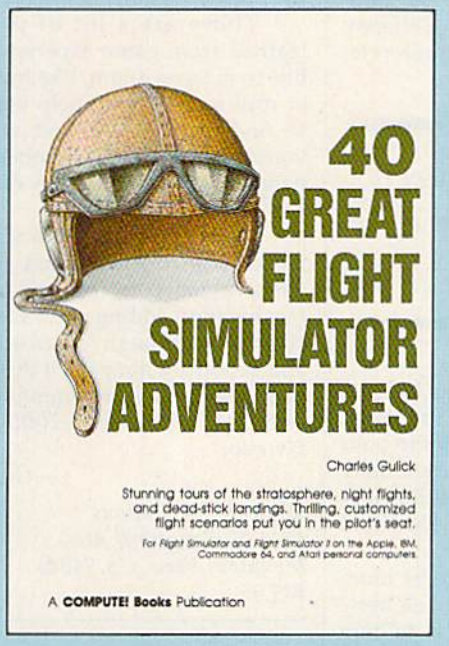
Backup utilities also available for the IBM, Apple II, Macintosh and Atari ST.
This product is provided for the purpose of enabling you to make archival copies only.

Discover the thrill of flying!

with COMPUTE! Books'

40 Great Flight Simulator Adventures

- Maneuver around the towers of the World Trade Center.
- Sightsee the Hudson River.
- Practice night flying and aerobatics.


40
GREAT
FLIGHT
SIMULATOR
ADVENTURES
Charles Gulick
Stunning tours of the stratosphere, night flights, and dead-stick landings. Thrilling, customized flight scenarios put you in the pilot's seat.
For Flight Simulator and Flight Simulator II on the Apple, IBM, Commodore 64, and Atari personal computers.
A COMPUTE! Books Publication

40 Great Flight Simulator Adventures
Charles Gulick
Forty exciting, customized flight simulator scenarios put you in the pilot's seat as you fly over bridges, around skyscrapers, and land at mysterious airports. *Flight Simulator* (IBM PC) and *Flight Simulator II* (Apple II, Commodore 64, Atari) are two of the most popular games/simulations for personal computers. With this book, you can experience flight adventures from the moment you load the program. Parameters set up each flight and a running commentary describes what you'll see (and where to look to see it). Ranging from the simple and straightforward to the advanced and even mystical, these 40 flights will open a new dimension to an already outstanding program.
$10.95 ISBN 0-87455-022-X

Note: *Flight Simulator* from Microsoft Corporation or *Flight Simulator II* from Sublogic Corp. is required in order to use this book. The book is designed to enhance the programs.

Please send me _____ **copies of *40 Great Flight Simulator Adventures* at $10.95 each.**
(ISBN No. 0-87455-022-X)

All orders must be prepaid in U.S. funds.

Subtotal _____
NC residents add 5% tax _____
NY residents add 8.25% tax
$2.00 shipping and handling charge per book. _____
Total amount enclosed _____

To order this exciting adventure guide, mail the attached coupon with your payment to COMPUTE! Books, P.O. Box 5038, F.D.R. Station, New York, Ny 10150. Or call toll free 1-800-346-6767 (in NY 212-887-8525.)

☐ Payment enclosed (check or money order)
☐ Charge ☐ Visa ☐ MasterCard ☐ American Express

Name _____
Address _____
City _____ State _____ Zip _____
Please allow 4–6 weeks for delivery.

COMPUTE! Publications, Inc. abc
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies
825 7th Avenue, 6th Floor, New York, NY 10019
Publishers of COMPUTE! COMPUTE!'s Gazette, COMPUTE!'s Gazette Disk, COMPUTE! Books, COMPUTE!'s Apple Applications, and COMPUTE!'s Atari ST Disk and Magazine.

COMPUTE! books are available in Canada from McGraw-Hill, Ryerson Ltd., 330 Progress Ave., Scarborough, Ontario, Canada M1P 2Z5.

Roadwar 2000

In the year 2000, bacteriological war destroyed civilization. Cities turned into prizes held by powerful factions, while the highways, which once carried the commerce of a great nation, became deadly battlefields. Now, at the request of what's left of the federal government, we have been trying to locate eight scientists, and return them to a secret underground lab so a vaccine can be developed to neutralize the microbes released during the war.

It hasn't been easy. Food and fuel are in short supply. We've been fighting constant battles with mutants, cannibals, and rival road gangs. We left Dallas a week ago with almost 300 people. Now we're in San Francisco with only 50. Out of the nine vehicles we started with, only a flatbed truck remains.

SSI is best known for its realistic simulations, war games, and fantasy role-playing games. But *Roadwar 2000*'s approach is something quite different.

Unlike other SSI games, which allow one player to play against the computer or which offer a two-player option, *Roadwar 2000* is a one-player game in which the computer plays an apparently subordinate role. However, it's easy to forget the computer is controlling the action. You may find yourself wondering about the Machiavellian intelligence controlling the opposition. You'll be encountering various groups of people. Sometimes you'll find mobs of starving people, ready to swear allegiance to you in return for a mouthful of food. You may even encounter trained mercenaries, ready to join forces with you and strengthen your band.

Other times, those you meet will be somewhat less than desirable—definitely not the type you'll want as companions as you travel through a hostile land.

Finding food and fuel is a serious problem. Since the country has fallen into anarchy, normal commerce is impossible. Searching and looting the ruins of the cities is the best way to locate caches of food. You'll need to monitor your stores of food and fuel closely. It's easy to find yourself in a barren wasteland without the means to continue your journey.

Your commands are issued through a series of menus displayed under maps of the area you currently occupy. Moving around the map in search of loot, people to recruit for your gang, or vehicles is the most common exercise. From time to time, you'll need to fix flat tires, cache surplus supplies, and conduct other necessary business. All commands are entered by pressing a single key.

Movement is over terrain you would expect: plains, farmland, mountains, desert, and woods. If you survive long enough, you'll move over 30 different types of terrain and through 120 cities. By the way, you're not limited to what was once the United States. Try visiting Mexico or Canada. Maybe a vacation in the Bahamas would be nice. But be warned; things have changed.

Many decisions are necessary. Stay in a city too long, and you could deplete the already limited resources of the area. As leader, you're responsible for equipping your force. Lead wisely, recruit the right mix of people and specialists, and you'll do well. Mistakes are costly, and your force may actually desert if you prove a weak and ineffectual leader.

You'll also need to strengthen your vehicles. More than a means of transportation, your vehicles may be hardened into real war wagons. Different vehicle types are available; motorcycles offer good fuel economy, but a bus can carry—and withstand—more firepower. You may have up to 15 vehicles in your gang, and each one is rated individually in 24 categories. A normal station wagon is no match for a battle-hardened off-road sedan.

Staying alive long enough to piece the puzzle together is the real problem.

Which combat tactics will be more effective? Is a hit-and-run attack best? Sometimes the best choice is to ram your opponent. *Roadwar 2000* offers the choices of detailed combat resolved down to the individual combatant, or simply the strategy involved with moving masses of people.

When you're meeting another road gang, combat is inevitable. There are three modes in which to resolve combat: abstract, tactical, and quick. When another gang is encountered, the computer prompts, FIGHT DETAILED ROAD COMBAT? If you answer *No*, the abstract mode is selected, where the battle is swift and bloody. Respond *Yes* and follow the prompts to select either tactical or quick combat.

During tactical combat, the display shifts to a smaller area, displaying your vehicles and the vehicles of the rival gang. You'll find many variable factors during detailed road combat. It's up to you to maneuver your vehicles, gain whatever advantage you can, then destroy your adversary. No time here to be merciful. Any sign of weakness will cost you dearly. If you've seen the combat sequences in the *Mad Max* films, then you know what to expect.

Combat is really only a small part of this game, although it's a crucial one. Shrewdness in noncombat situations is equally important. The tactics you employ will lead to your ultimate victory or defeat. Never lose sight of your goal to find the eight scientists and return them to the secret underground lab.

As with most SSI games, *Roadwar 2000* isn't a quick one-evening affair—playing time is estimated at over 50 hours. The game I'm presently enjoying has lasted well over the 50-hour mark.

Locating the eight scientists is difficult. You'll need the help of secret agents located around the country. They'll reveal themselves to you from time to time. Staying alive long enough to piece the puzzle together is the real problem.

There are a lot of things I've learned from game experience that I'd like to tell you about, like how a doctor or drill sergeant can help you. Or how to find the healers, and what to do when the mutated microbes contaminate your gang. But the discovery is part of the fun.

Roadwar 2000 offers a strategy and tactics scenario combined with swift, decisive action to form an unbeatable combination adding up to sustained excitement. Although fast arcade graphics and action are not part of this game, excellent graphics and attention to detail will make *Roadwar 2000* a lasting favorite.

—George Miller

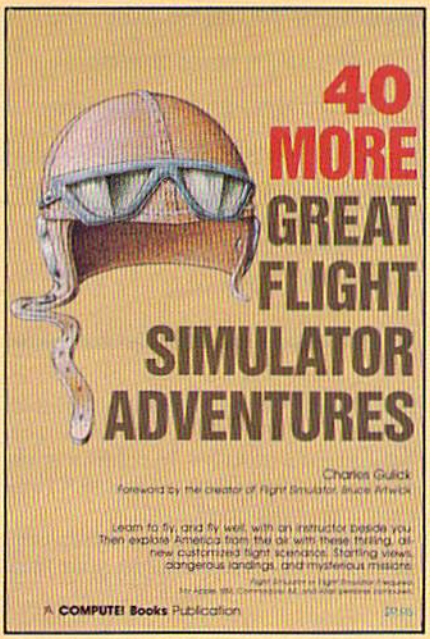
Strategic Simulations
1046 N. Rengstorff Ave.
Mountain View, CA 94043
$39.95

All programs listed in this magazine are available on the GAZETTE Disk. Details elsewhere in this issue.

Fly Faster and Farther

with COMPUTE!'s

40 More Great Flight Simulator Adventures



This follow-up to the popular *40 Great Flight Simulator Adventures* brings you 40 more exciting, suspenseful flight simulator scenarios to help you get the most enjoyment from your *Flight Simulator* or *Flight Simulator II* software.

40 More Great Flight Simulator Adventures

Charles Gulick

Microsoft's *Flight Simulator* (IBM PC) and Sublogic's *Flight Simulator II* (Apple II, Commodore 64, Atari) are two of the most popular software packages today. They put you in the pilot's seat, letting you experience the thrill of flight. Now, *40 More Great Flight Simulator Adventures,* the second such guide, brings you more dazzling flights drawn from both fact and fancy.

Now you can fly where no one has flown before, with the author as your flight instructor. He helps you explore the unknown regions of flight simulation—taking you through cities, over mountains, under bridges—as you explore America from the air. Complete parameters and instructions at each step make flight easier and more exciting than ever before.

$12.95 ISBN 0-87455-043-2

Note: The *Flight Simulator* program itself is not included and must be purchased separately.

To order any COMPUTE! book, call toll free 800-346-6767 (in NY 212-887-8525). Or mail in the attached coupon with your payment. Include $2.00 shipping and handling per book.

Please send me _____ copies of *40 More Great Flight Simulator Adventures* at $12.95 each. (ISBN 0-87455-043-2)

All orders must be prepaid in U.S. funds.

Subtotal _____

NC residents add 5% sales tax _____
NY residents add 8.25% sales tax

$2.00 shipping and handling per book _____
($5.00 per book airmail)

Total amount enclosed _____

COMPUTE! Books
P.O. Box 5038
F.D.R. Station
New York, NY 10150

☐ Payment enclosed (check or money order)

☐ Charge ☐ Visa ☐ MasterCard ☐ American Express

Name _____

Address _____

City _____ State _____ Zip _____

Please allow 4–6 weeks for delivery.

COMPUTE! Publications, Inc. abc
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies
825 7th Avenue, 6th Floor, New York, NY 10019
Publishers of COMPUTE!, COMPUTE!'s Gazette, COMPUTE!'s Gazette Disk, COMPUTE! Books, and COMPUTE!'s Apple Applications

COMPUTE! books are available in Canada from McGraw-Hill, Ryerson Ltd., 330 Progress Ave., Scarborough, Ontario, Canada M1P 2Z5.

Certificate Maker

Is there someone you want to reward for a job well done? Do you have students whose achievements you want to recognize? Then this program is for you.

Springboard Software has introduced *Certificate Maker* for the 64—a second cousin to the company's earlier *Newsroom* newsletter printing package that helps you make professional-looking certificates of merit. With over 200 certificate designs to choose from, the ability to make multiple certificates, and its easy-to-follow, menu-driven format, *Certificate Maker* is a handy, engaging program to have around.

You're given a manual that uses straightforward directions accompanied by a flow chart diagram composed of the actual menu screens. This manual also carries illustrations of the certificate designs provided on a second disk. These range from humorous, such as the "Couch Potato Award," to serious scholastic and religious awards that school and church classes might use.

All of the designs (called templates) can be partially customized by choosing one of 24 borders and one of five fonts, and by deciding how to word the certificate. The only part that can't be customized is the graphic. We think this is a bit of a drawback, especially since some templates are blank. You add the words, but there is no way to add a graphic. However, under the fonts section, the manual mentions possible future additions to *Certificate Maker*. Perhaps they'll expand on the graphic feature, too.

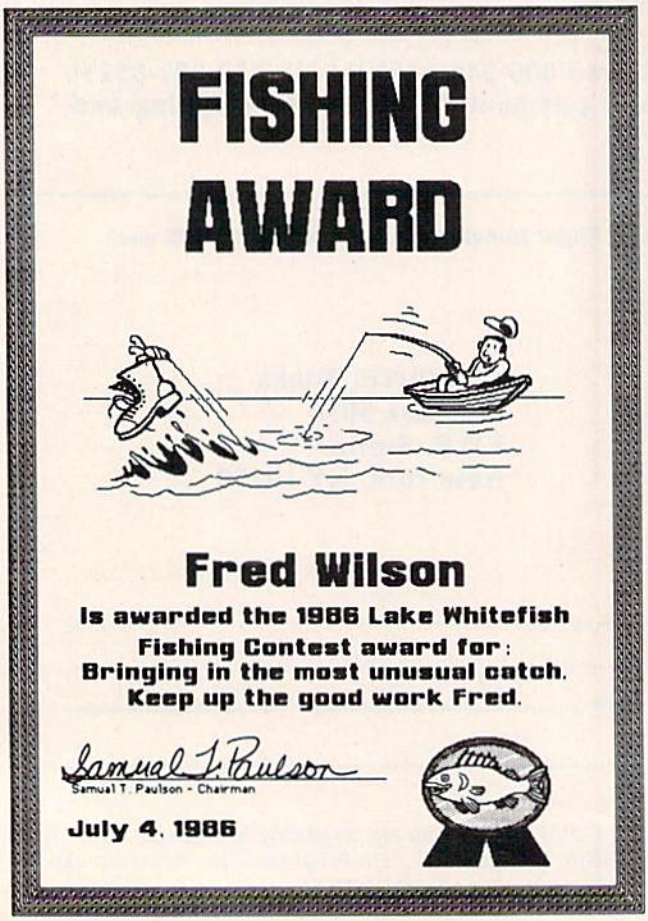
After you've followed the menus to design your certificate—a task so easy you can almost get by without reading the manual—you print it out. If you wish to make more than one of the same design, there is a way to make a series of certificates, each with a different person's name on it. This is done by creating a name file. You are allowed room for 75 names per file and 25 characters per name. The file, which must be stored on a separate data disk, is easily created with the aid of more clear-cut menus. It can be edited at any time, and it autoalphabetizes, too.

Printing the certificate revealed the only actual problem with *Certificate Maker* that we could find, and this is a problem that may be particular to one printer. We use a C. Itoh 8510 Prowriter. *Certificate Maker* is set up for making multiple certificates, but in doing so, we developed a travel problem. After we had printed eight or ten certificates, the certificate was being printed about a quarter-inch closer to the bottom of the page, significant when you're attempting a professional-looking, centered piece of work. Depending on the size of your name file, this could mean up to nine repositionings of printer paper for a multiple run of certificates, reducing the convenience of this feature. However, the problem could be peculiar to the C. Itoh Prowriter.

With over 200 certificate designs to choose from, the ability to make multiple certificates, and its easy-to-follow, menu-driven format, Certificate Maker *is a handy, engaging program to have around.*

Once your certificates are printed, you may wish to add one other touch. Springboard includes 36 colorful stickers which can be used as seals to further customize your work.

The usefulness of this program can't be beat. From congratulating your mate



Certificate Maker *offers 24 borders and 5 fonts for creating your own certificates.*

for some outstanding feat of spousemanship to marking the completion of a Sunday School year, from presenting a colleague with the "Infecting Co-Workers Award" to honoring your students' excellence in musical performance, there is practically no end to the ways you can use *Certificate Maker*. We passed out 24 Best Friends awards to our daughter's kindergarten class, ones that she helped make. The kids loved them, and the parents were impressed, too. Our school (using the Apple version) has also found ample uses for certificates. We recommend *Certificate Maker* highly—no matter whether you use your Commodore at home, school, church, or for any other organization that might wish to honor its members. Springboard deserves a certificate of its own for this creative, easy-to-use, practical program.

—David and Robin Minnick

Springboard Software
7808 Creekridge Circle
Minneapolis, MN 55435
$49.95

I Am The C128

I Am The C128 from Personal Choice Software (distributed by Activision) is a beginner's tour through the Commodore 128 computer in nine "volumes," or multipart chapters. For neophytes who prefer their tour on the computer screen rather than in a book or magazine, this disk is a fine introduction to programming in BASIC on the 128. You certainly get a closer, more intimate view this way; the hands-on approach has much to recommend it.

The tour consists of an introduction to microcomputing and software, the 128 (with emphasis on the keyboard) and disk drive, BASIC, graphics, and sound. The new 7.0 BASIC graphics and sound commands, as well as those accessing the disk drive, are particularly well covered in *I Am The C128*.

Required hardware—in addition to the 128—is a 1571 disk drive (the 1541 will not work) and a 40-column monitor (color preferred, but not essential). You also need a basic sound system (amplifier and speaker/headphones or TV sound) for the extensive sound and music demos. Though one might wish the program had accommodated the 1541, it is likely that *first-time users*—those for whom this program is written—will have purchased the 1571, rather than the older and slower drive. A color monitor/TV is ideal for both the material on screen graphics and the color-coded keyboard demonstration, but is otherwise incidental.

The nine volumes are titled Introduction, The C128, BASIC, Advanced BASIC, Disk Usage, Screen Graphics, Sprite Graphics, Sound Effects & Music, and Programming Hints. From a master table of contents, you choose a volume; a volume menu then presents a set of chapter headings. Once a chapter is selected, you're taken straight through the rest of the volume, ending with a review—a useful feature that summarizes the volume. At any point you may exit by pressing one of two keys: ESC returns you to the volume menu; F1 returns you to the main table of contents. You can also flip back and forth between pages (*slowly*) by using the up- and down-cursor keys.

... this disk is a fine introduction to programming in BASIC on the 128. You certainly get a closer, more intimate view this way; the hands-on approach has much to recommend it.

The program is virtually foolproof. The only way I have found to "confuse" the program is to hit ESC during the initial program display (which is long—the user will often wish to bypass it). The appropriate exit (not mentioned in the "Tourbook" pamphlet) is to press F1 (which is also the only way to recover from the above-mentioned abortive ESC).

Even with the use of screen blanking (FAST mode, I assume), quite a lot of time is expended in disk access—especially at initial load. Some volumes take over 30 seconds to bring up. Once into a volume there are no delays until you hit F1 or ESC, whereupon everything is reloaded. A single HELP screen, summarizing the various methods of navigating *I Am The C128*, is always immediately available.

The program is logically conceived and user-friendly. Overall, its most attractive feature is the large number of short programs displayed onscreen to study and run, particularly in the graphics and sound volumes. Sound and music treatment is especially comprehensive, with extensive program demos that are excellent overall; only a few are unnecessarily confusing (such as the filter and octave demos). In passing, I should point out one program error: The fifth ENVELOPE waveform is purported to be ring modulation; it is instead a simple triangle wave. For the bell-tone of actual ring modulation, an additional frequency must be given the modulating oscillator. (This was apparently not done, and use of a second oscillator is not mentioned).

For the most part, material is presented in textbook fashion, page by page. The program provides *some* interaction, *some* graphics, *some* demos, but not as much as there could be, as these are the major reasons for doing a tour on the computer itself. Probably the best examples for study are the separate SCREEN, SOUND, and SPRITE programs. All are well commented, though SOUND and SPRITE are short and simple. SCREEN, on the other hand, is substantial and of considerable help in showing how to create various shapes and figures onscreen.

I have discovered only one other problem detail that might confuse the beginner: The discussion of DIRECTORY under "Disc Usage" states that when you press F3, a disk directory will appear. This is true, *except in this program* (the alert "student" will no doubt try pressing F3 at this point).

All in all, this is a useful introduction for the neophyte wishing to take his or her first steps through 7.0 BASIC, particularly in relation to sound, graphics, and disk access. Armed with *I Am The C128* and the documentation packed with the computer, new users should be well on their way to developing BASIC programming expertise and to getting the powerful 128 to do what *they* want.

—Art Hunkins

Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
$34.95

Moving?

For address changes or subscription information, call toll free **800-247-5470** (in Iowa 800-532-1272).

PRO-TECH TRONICS

C-64 COMPUTER

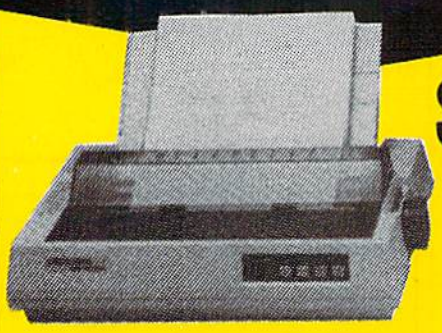
$99

*WITH PURCHASE OF SPECIALLY PRICED SOFTWARE PACKAGE

FACTORY SERVICED FULL WARRANTY

FREE HOME TRIAL

PRINTER



$149

SEIKOSHA

NEAR LETTER QUALITY

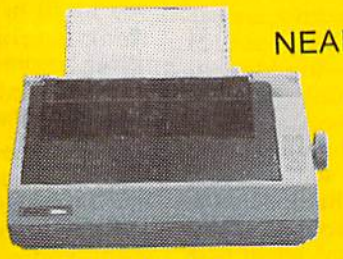
- 100 CPS Draft Mode
- 20 CPS NEAR LETTER QUALITY MODE
- Commodore Ready

PRINTER

star micronics

SG-10-C

$198



COMMODORE READY

NEAR LETTER QUALITY

- 120 CPS Draft
- 30 CPS NEAR LETTER QUALITY
- Includes Both...
  —TRACTOR FEED
  —FRICTION

FREE TRIAL PERIOD

CALL TODAY
OPEN 7 DAYS A WEEK & EVENINGS

1-800-345-5080

COMMODORE

C-128

$199

*WITH PURCHASE OF 1571 DISK DRIVE

FACTORY SERVICED FULL WARRANTY

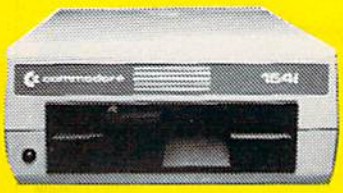
AMIGA

$799

*MONITOR $50 ADDITIONAL

FREE TRIAL PERIOD

DISK DRIVE



1541 COMMODORE

$148

MODEMS

300 BAUD

$28

$98 1200 BAUD HAYES COMPATIBLE

POWER SUPPLY

C-64

$39

JOY STICKS

$9

CABLE TV

NO PAY TV? CONVERTERS/ DECODERS

- JERROLD
- OAK
- HAMLIN

FREE HOME TRIAL

RADAR DETECTOR

RETAIL $249

MAXON SUPERHET

$78

QUICK-DELIVERY

MasterCard AMERICAN EXPRESS VISA C.O.D.

SCHOOL P.O.'s ACCEPTED

PRO-TECH-TRONICS
6860 Shingle Creek Parkway #201
Minneapolis, MN 55430
(612) 560-6603

Print Shop To GEOS

Bruce Wilkinson

Transfer Print Shop *graphics to* GEOS *with this clever utility.*

The *GEOS* operating system comes with a powerful paint program known as *geoPaint*, but so far there are few picture libraries available for it. *"Print Shop* To *GEOS"* lets you convert pictures and diagrams from Brøderbund's very popular *Print Shop* graphics printing program to *GEOS* file format so that you can use them in *geoPaint* and *geoWrite*.

Print Shop To *GEOS* is written entirely in BASIC. Type it in and save a copy to a *GEOS* work disk. Make sure that there's a Photo Scrap file on the disk. (If there isn't, you'll have to create one. First, run *geoPaint* by double-clicking on its icon from the *GEOS* deskTop. Following the instructions in your *GEOS* manual, CUT or COPY any part of the screen. Then exit *geoPaint*. This procedure saves the copy buffer into a file called Photo Scrap.) A word of caution: The *Print Shop* To *GEOS* program creates a temporary disk file named S, so if you already have a file of that name on the work disk, you must delete or rename it.

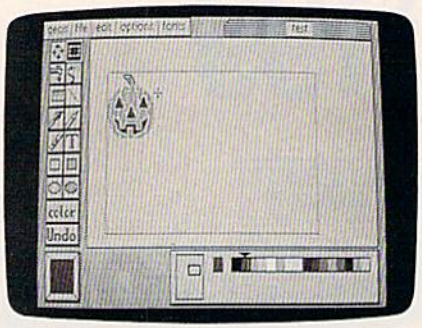
Moving Pictures

Once you have prepared the work disk, run the conversion program from the deskTop by placing the cursor on the program icon and double-clicking. When the program requests the *Print Shop* disk, remove the work disk and insert the disk holding the *Print Shop* graphic. The program then asks if the image is for a Commodore (side B) or Other (side A) printer. Although the program can handle either side A or side B of the *Print Shop* graphic library disks, side B graphics look better when printed from *GEOS*.

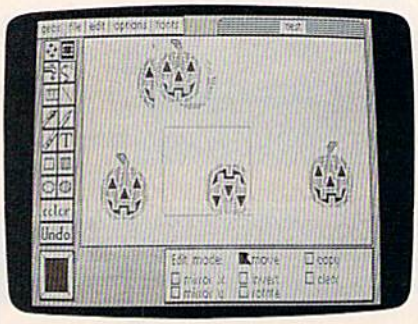
The program requests a filename for the desired *Print Shop* graphic image. If you aren't sure of the name, press RETURN to view the directory. The program lists the files which are likely to be graphics files. The criteria the program uses to select a file are that it must be a PRG file and it must be three blocks long for side A or two blocks long for side B. In some instances, files that are not graphics files may meet these criteria and appear in the list. Ignore these files.

Print Shop To *GEOS* lists up to 16 filenames. If there are more files in the directory, you may view them by pressing RETURN again. Press the left arrow key to abort the directory display. If you abort, the program asks that you insert a different disk. To load the image, type the name of the desired file and press RETURN. Alternatively, use the cursor keys to move the cursor to a filename and press RETURN.

Now place the *GEOS* work disk back into the drive and press RETURN. The program saves the image as a Photo Scrap file. After the file is saved, place the master *GEOS* disk in the drive and press RESTORE to reboot *GEOS*.



A Print Shop *picture has been loaded into* geoPaint.



Once in geoPaint, *the picture can be rotated and mirrored.*

You may now paste the captured image into a Photo Album, *geoPaint* file, or *geoWrite* file. By pasting the graphics into a Photo Album, an entire library of graphic images can be created for later use.

See program listing on page 98.

COMMODORE

C-64-C COMPUTER

INCLUDES GEOS

NEW!

C-64-C

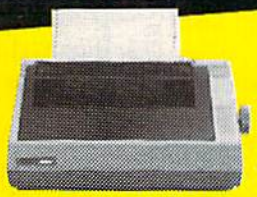
$168

*WITH PURCHASE OF DISK DRIVE

PRINTERS

803-C
COMMODORE

$139



star MICRONICS, INC.

$198

LETTER QUALITY DAISYWHEEL

MONITORS

RETAIL $120

$59

MONOCROME MONITOR

RETAIL $299

$139

FULL COLOR

RGB

RETAIL $400

$199

CALL TODAY!

PRO-TECH-TRONICS

6860 Shingle Crk. Pkwy. #201
Minneapolis, MN 55430
(612) 560-6603

QUICK-DELIVERY

VISA

OPEN 7 DAYS A WEEK & EVENINGS

1-800-345-5080

The Versatile CIRCLE

Paul W. Carlson

The 128's CIRCLE command can do much more than draw circles, as you'll see with these short and impressive graphics demo programs.

The four programs accompanying this article demonstrate how easy it is to use the CIRCLE command to draw attractive geometric shapes on the Commodore 128.

A circle on the 128 is actually drawn as a polygon with 180 sides, so it's ideal for drawing many different geometric figures. We'll be drawing regular polygons—ones with all sides the same length and all angles the same size.

Program 4, which is based on "MODified Shapes for IBM," a program I had published in the May 1986 issue of COMPUTE!, shows the final result of all four programs. However, if you want to better understand the CIRCLE command, let's begin with Program 1.

A First Step

Type in Program 1. When you've finished typing, save a copy to tape or disk, then load the program and type RUN. This program draws three different shapes—an equilateral triangle, a square, and a hexagon. CIRCLE can be used to draw polygons with any number of sides, but these three are the shapes we'll be using in the final program.

To understand how CIRCLE can be used to produce these shapes, take a look at line 130 in the program:

```
130 CIRCLE C,CX,CY,XR,YR,SA,EA,0,
    360/NS
```

The command CIRCLE is followed by a list of arguments, each separated by a comma. Like all graphics statements that draw on the screen, the first argument, C, is the color source.

The next two arguments, CX and CY, are the horizontal and vertical coordinates of the center of the polygon that is to be drawn. The center of a polygon with an odd number of sides won't be midway between the top and bottom of the polygon—so you may notice that the triangle is not centered vertically on the screen, although it has the same center coordinates as the square and the hexagon.

The next two arguments, XR and YR, are the horizontal and vertical radius of an imaginary circle that passes through every corner of the polygon. It's here that we have to take into account the fact that the pixels on most monitors and TV screens aren't square. In high-resolution mode, a pixel's height is about 1.4 times its width. This height-to-width ratio is known as the aspect ratio. To prevent the shapes from being elongated vertically, the horizontal radius must equal the vertical radius times the aspect ratio. The variable AS in line 10 of the program is the aspect ratio—try changing its value to see what happens.

The next two arguments, SA and EA, are the starting and ending angles, measured in degrees. To draw a complete polygon the ending angle must be 360 degrees greater than the starting angle. The starting angle determines the position of the first vertex of the polygon. With a starting angle of zero, the first vertex would be at the very top of the polygon. The program uses a starting angle equal to 180 divided by the number of sides to turn the polygon clockwise so the last edge is horizontal at the top.

BASIC 7.0's CIRCLE command makes it easy to create pictures like this.

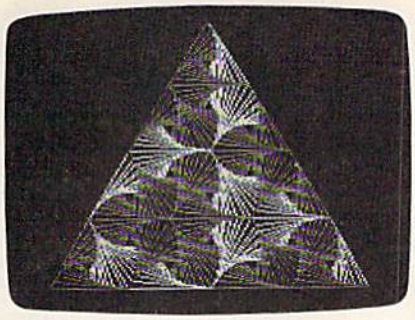
The next argument is the rotation angle. The program uses a rotation angle of zero degrees. You may wonder why I use the starting angle to rotate the polygons rather than the rotation angle. The reason is that any rotation angle other than zero or 180 degrees has the effect of changing the aspect ratio (unless the aspect ratio is 1). This leads to an important rule that is not stated in the manual: For any aspect ratio other than 1, use the starting angle to rotate the polygon, not the rotation angle.

The final argument is the number of degrees between the sides of the polygon. This is 360 divided by the number of sides.

The variable SU is not used by this program, but it is used in Program 2.

Scaling And Rotating

If you have Program 1 in memory, just add four lines—80, 90, 110, and 150—to create Program 2. (The underlined ↑ character in lines 80 and



In this photo, several small triangles were drawn with the CIRCLE command to make a larger triangle.

90 is π, achieved with SHIFT-↑.) When you've made these additions or have typed in all of Program 2, save it with a new filename. Then, load and run it. Lines 110–150 hold a FOR-NEXT loop with the CIRCLE command inside it. Each time through the loop, the polygon is scaled down by a factor of RF (computed in line 80) and rotated DA degrees (computed in line 90). The values of both RF and DA are determined by the value of the variable SU in line 10. It's interesting to change the value of SU slightly to see what happens.

Adding Color

Programs 1 and 2 plot complete polygons. However, the CIRCLE statement is able to draw partial polygons as well. Why would you want to do this? Suppose you wanted a polygon with sides of different colors; CIRCLE can do it. Program 3 can be made from Program 2 by adding or replacing lines 10, 60, 100, 120, and 140 from the listing of Program 3. Save the program with a different name, then load and run it. Lines 120–140 create another FOR-NEXT loop nested within the one that was in Program 2. Line 120 computes the ending angle by adding 360 divided by the number of sides to the starting angle, which causes the circle statement to draw just one side of the polygon each time through the loop. Because line 140 advances the starting angle by the same amount each time, a new side is drawn each time through the loop. The expression EA=SA+360 in lines 70 and 110 is no longer necessary and may be removed.

By drawing the polygons one side at a time, the program can use any of the three available colors for any side. The calculations for the variables B and C in lines 60 and 120 are used to determine the color each side will be.

Notice that the aspect ratio in line 10 was changed from 1.4 to 0.7. This is because in multicolor mode each pixel is twice as wide as in the high-resolution mode.

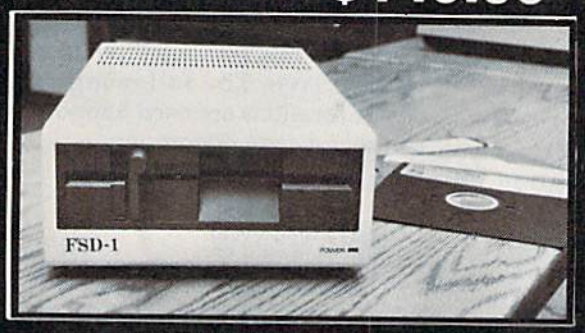
Complex Patterns

Program 4 combines the discoveries of the first three programs into a program that generates three different multicolored displays. Type it in, save it, and run it. As you watch the displays being drawn, remember that the only graphics command being used is CIRCLE.

This program rotates some of the triangles and squares counterclockwise inside each other to create the patterns. This means that the starting angles must decrease for each rotation. Because the CIRCLE command does not allow negative starting angles, the program adds 360 degrees to the starting angle to to insure that a negative number is not used. Note that any shape rotated 360 degrees is unchanged.

See program listings on page 108.

Commodore Compatible and only. . . $149.00



FSD-1 5¼"Disk Drive
Directly replaces the Commodore 1541 disk drive.

The FSD-1 Disk Drive is a versatile and efficient disk drive built for the Commodore series of personal computers. This disk drive is fully compatible with the Commodore 64* computer and directly replaces the Commodore 1541 Disk Drive.

Special Features

- Runs all C-64 commercial software
- Ready to run right from the box
- Full 6 month warranty
- Heavy duty construction
- Vented metal chassis
- Built especially for C-64 users

Visa & MasterCard welcome. Credit card orders shipped in 24 hrs. Allow $12.00 shipping and handling. Send mail order with payment to:

To Order call toll free 1-800-356-5178

ECI

Emerald Component International
Dept. S
541 Willamette Street
Eugene, OR 97401
Tel. 503-683-1154

COMMODORE 64 is a registered trademark of Commodore Electronics, Ltd

V3.0 ULTRABYTE DISK NIBBLER

NEW SIXTH GENERATION ULTRABYTE COPIER FOR COMMODORE 64 and 128 (in 64 mode)

- Copies 99+% of protected software in 2 min. or less includes parameters for 160 recent, hard-to-copy disks. (Send stamped envelope for list). Includes fast file copy program
- Uses 1 or 2 1541 /1571 drives, or MSD dual drive
- More powerful than KeyMaster, Diskbuster, Copy II, Superkit, 21 Second, Clone or Cracker
- Copies itself (for this reason, no refunds given)

SPECIAL — BUY A NIBBLER V3.0 AND GET YOUR CHOICE OF A FREE $14.95 PROGRAM
$39.95 plus $4.00 shipping

Disk Surgeon -- disk utility $14.95
Ultramail -- mail list and label printer.....$14.95
McMurphy's Mansion -- text adventure $14.95
Handy-Capper -- race handicap system ...$14.95

(Above may be ordered separately for $14.95 plus $4.00 shipping. Foreign orders add $2.00)

Mastercard, Visa, Check or M.O., Calif. add 6.5% ($2.60) sales tax. Foreign orders / COD add $2.00. Payment must be in U.S. funds

UPDATES - Return your original Ultrabyte disk with $10.00 plus $4.00 shipping. Foreign add $2.00

To order, write or call 24 hr. order line. For info. write.

ULTRABYTE (818) 796 - 0576
P.O. Box 789 LaCanada, CA 91011 USA

DEALERS & DISTRIBUTORS WANTED

TurboSave 128

Michael Henry

This easy-to-use utility makes all your saves at turbo speed—up to six times faster than normal—on the Commodore 128 with a 1571 disk drive. Other useful features are also included.

If you own a 128 and a 1571 disk drive, you're probably still amazed at the speed with which your programs load. Unfortunately, the 1571 is as slow as the 1541 when it comes to saving programs. "TurboSave 128" offers a solution. It allows you to save 64K of memory to a blank, formatted disk in 23 seconds—six times the speed of a normal save. Here's a chart showing the difference between TurboSave and the standard SAVE routine:

	TurboSave	Commodore SAVE
10 blocks	3½ sec	9½ sec
100 blocks	12 sec	60 sec

TurboSave is invisible to the operating system and the user, so it works equally well with all save commands—BASIC's SAVE, DSAVE, and BSAVE, and the monitor's S command. Except for its lack of support for the bug-ridden Save-with-Replace, TurboSave is completely compatible with Commodore's standard SAVE. And it will never create an unclosed *splat-file*, either.

Typing It In

TurboSave is written entirely in machine language, so you must enter it using the "128 MLX" machine language entry program found elsewhere in this issue. When MLX asks for a starting and ending address, respond with these values:

Starting address: 0C00
Ending address: 15BF

When you've finished typing in all the TurboSave data, be sure to save a copy to disk before you leave MLX.

TurboSave is simple to use. Just load it with a statement like this:

```
BOOT "TURBOSAVE",B1
```

Don't forget to add the extra ,B1 at the end of the command. This causes the data to be loaded into bank 1 of the 128's RAM. If you omit the bank specification, the program will load into bank 0 by default, where it will overwrite important system information such as function-key definitions. As an alternative, you can type in and save this short program to act as a boot program:

```
10 SCNCLR:PRINT"{DOWN}BOOTING
   TURBOSAVE"
20 BOOT"TURBOSAVE",B1
```

Pressing RUN/STOP-RESTORE disables TurboSave. You can also disable TurboSave with the following command:

```
BANK 1:SYS DEC("FFA8")
```

To reactivate it, enter:

```
BANK 1:SYS 12*256
```

TurboSave assigns this command to the SHIFT-RUN/STOP key combination, so you can also reactivate TurboSave simply by pressing SHIFT-RUN/STOP.

TurboSave causes no conflicts with BASIC, but machine language programmers should be aware of the memory locations used by the program. It occupies locations 3072–5563 ($0C00–$15BB) in block 1 RAM (bank 1), and uses locations 1024–1791 ($0400–$06FF) in that block for buffer storage. In block 0 RAM (bank 0), the program uses locations 3072–3327 ($0C00–$0CFF). This block is normally used as the RS-232 input buffer; any programs that use this area won't work with TurboSave. The following zero-page locations are used temporarily during a save operation:

6–8	($06–$08)
100–101	($64–$65)
106–110	($6A–$6E)
174–175	($AE–$AF)
193–194	($C1–$C2)

TurboSave eliminates automatic verifying to achieve its speed. If you wish to verify that your program was saved correctly, use the VERIFY statement following the SAVE. The VERIFY will occur as quickly as the SAVE did, so you'll still be way ahead of the normal save routine.

Altering TurboSave

TurboSave is designed to be flexible. Although it normally saves data in PRG files, you can change this with the following:

```
BANK 1:POKE DEC("D29"),x
```

where *x* is one of the following the values:

Value	File type
129	sequential (SEQ)
130	program (PRG)
131	user (USR)
132	relative (REL)

Add 64 to these values if you wish the file to be automatically locked after it is saved. For example, a value of 194 (130 + 64) would cause TurboSave to create locked program files. TurboSave normally writes the starting address of the data being saved as the first two bytes of the file. This is standard practice for Commodore program files, but you may want to disable this feature if you are creating another file type. To prevent the load address from being saved, use this statement:

```
BANK 1:POKE DEC("D47"),0
```

This is especially useful when creating text files, which need no load address. However, remember that program files can't be loaded normally unless they contain a starting address. You can reenable the starting address feature with

```
BANK 1:POKE DEC("D47"),1
```

See program listing on page 100.

All programs listed in this magazine are available on the GAZETTE Disk. See elsewhere in this issue for details.

TurboSave 64

William Voosen

Now you can save files three-to-five times faster on the 1541 disk drive.

In 1986, the GAZETTE published several turbo utilities—programs that greatly speed up disk operations: "Turbo Copy" (April) speeds up file copying; "TurboDisk" (August) speeds up disk loading time; and "Turbo Format" (November) cuts disk formatting time down to ten seconds while eliminating head knocking. Continuing in this tradition is "TurboSave 64," a machine language program that makes saves three to five times as fast by reprogramming the 1541 disk drive. Here's a chart showing the speed difference between "TurboSave 64" and the standard SAVE routine:

	TurboSave	Standard SAVE
8 blocks	3 sec	9 sec
128 blocks	17 sec	87 sec

Once TurboSave is activated, all saves take place at high speed.

The program is written entirely in machine language, so you must enter it using "MLX," the machine language entry program found elsewhere in this issue. When MLX asks for a starting and ending address, respond with these values:

```
Starting Address:  0801
Ending Address:    0D30
```

When you've finished entering the data, save a copy to disk. To load the utility, type LOAD"TURBOSAVE",8. (Substitute the name you used to save the program.) To activate TurboSave, just type RUN as you would for a BASIC program. Pressing RUN/STOP–RESTORE disables TurboSave. Enter SYS 710 to reenable it.

This utility maintains all the error checking of the standard SAVE routine except automatic verification. If you wish to verify the save, use the VERIFY command. To increase the speed of the save, the screen is turned off briefly during the high-speed save.

Compatibility

Some printer interfaces interfere with TurboSave 64. If your printer interface causes problems with TurboSave, you may have to disconnect it while using the program. Be sure to test the program carefully before using it with an important disk.

TurboSave 64 is compatible with the DOS 5.1 wedge. The program uses 27 bytes at locations 710–736 ($02C6–$02E0), but the bulk of the program is stored in the RAM under the BASIC ROM. Because TurboSave reprograms the disk drive, a portion of the program is also transferred into the disk drive's internal memory. The transfer of data to the drive RAM requires about 1.5 seconds. That overhead is the same for all saves, so there is less speed improvement for saving small programs than for saving large ones.

See program listing on page 99.

User Group Update

When writing to a user group for information, please remember to enclose a self-addressed envelope with postage that is appropriate for the country to which you're writing.

Send typed additions, corrections, and deletions for this list to:

COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403
Attn: Commodore User Groups

User Group Notes

The **Concord Area Commodore Enthusiasts (CACE)** users group has disbanded. Other users in this area may contact the **Diablo Valley Commodore Users Group**, P.O. Box 27155, Concord, CA 94527.

The **San Luis Obispo Commodore Computer Club (SLOCCC)** has changed its address to P.O. Box 3836, San Luis Obispo, CA 93403-3836.

The new address for the **Canton Area Commodore Users Group (CACUG)** is 13 N. 17th Ave., Canton, IL 61520.

The **Cache Valley Computer Club**'s new address is 315 W. 400 S., Smithfield, UT 84321.

The **VIC-20 Users Group of Richmond** and the **C-64 Users Group of Richmond** have united to form **CURVE**, P.O. Box 28284, Richmond, VA 23228.

You can now write to the **Stuggart Local Commodore Users Group** in care of Don Rimestad, HHC VII Corps, P.O. Box 228, APO, NY 09107. The group meets in Germany.

The corrected address for the **Toronto Pet Users Group (TPUG)** is 5300 Yonge St., Willowdale, Ont., M2N 5R2, Canada.

New Listings

CALIFORNIA

Alpha Omega Telecommunications Group, P.O. Box 1339, Citrus Heights, CA 95611-1339

DELAWARE

First State Commodore Club, P.O. Box 1313, Dover, DE 19903

FLORIDA

Gold Coast Commodore Group, P.O. Box 375, Deerfield Beach, FL 33441

NEW JERSEY

South Jersey C-64 Users Group, 108 N. Newark Ave., Ventnor, NJ 08406

WISCONSIN

Menomonie Area Commodore Users Group, 510 12th St., Menomonie, WI 54701

UNLEASH THE DATA ACQUISITION AND CONTROL POWER OF YOUR COMMODORE C64 OR C128.
***We have the answers* to all your control needs.**

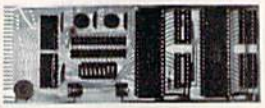
NEW! 80-LINE SIMPLIFIED DIGITAL I/O BOARD

- 40 separate buffered digital output lines can each directly switch 50 volts at 500 mA.
- 40 separate digital input lines. (TTL).
- Socket for standard ROM cartridge. Create your own autostart dedicated controller without relying on disk drive.
- I/O lines controlled through simple memory mapped ports each accessed via a single statement in Basic. No interface could be easier to use. A total of ten 8-bit ports.
- Included M.L. driver program optionally called as a subroutine for fast convenient access to individual I/O lines from Basic.
- Plugs into computer's expansion port. For both C64 & C128. I/O connections are through a pair of 50-pin professional type strip headers.

Order Model SS100 Plus. Only $119! Shipping paid USA. Includes extensive documentation and program disk. Each additional board $109.

We take pride in our interface board documentation and software support, which is available separately for examination. Credit against first order. SS100 Plus, $20. 64IF22 & ADCO816, $30.

OUR ORIGINAL ULTIMATE INTERFACE



- Universally applicable dual 6522 Versatile Interface Adapter (VIA) board.
- Industrial control and monitoring. Great for laboratory data acquisition and instrumentation applications.
- Intelligently control almost any device.
- Perform automated testing.
- Easy to program yet extremely powerful.
- Easily interfaced to high-performance A/D and D/A converters.
- Four 8-bit fully bidirectional I/O ports & eight handshake lines. Four 16-bit timer/counters. Full IRQ interrupt capability. Expandable to four boards.

Order Model 64IF22. $169 postpaid USA. Includes extensive documentation and programs on disk. Each additional board $149. Quantity pricing available. For both C64 and C128.

A/D CONVERSION MODULE

Fast. 16-channel. 8-bit. Requires above. Leaves all VIA ports available. For both C64 and C128. Order Model 64IF/ADCO816. Only $69.

SERIOUS ABOUT PROGRAMMING?

SYMBOL MASTER MULTI-PASS SYMBOLIC DISASSEMBLER. Learn to program like the experts! Adapt existing programs to your needs! Disassembles any 6502/6510/undoc/65C02/8502 machine code program into beautiful source. Outputs source code files to disk fully compatible with your MAE, PAL, CBM, Develop-64, LADS, Merlin or Panther assembler, ready for re-assembly and editing. Includes both C64 & C128 native mode versions. 100% machine code and extremely fast. 63-page manual. The original and best is now even better with Version 2.0! Advanced and sophisticated features far too numerous to detail here. $49.95 postpaid USA.

C64 SOURCE CODE. Most complete available reconstructed, extensively commented and cross-referenced assembly language source code for Basic and Kernal ROMs, all 16K. In book form, 242 pages. $29.95 postpaid USA.

PTD-6510 SYMBOLIC DEBUGGER for C64. An extremely powerful tool with capabilities far beyond a machine-language monitor. 100-page manual. Essential for assembly-language programmers. $49.95 postpaid USA.

MAE64 version 5.0. Fully professional 6502/65C02 macro editor/assembler. 80-page manual. $29.95 postpaid USA.

SCHNEDLER SYSTEMS
1501 N. Ivanhoe, Dept. G4, Arlington, VA 22205
Telephone Orders/Information (703) 237-4796

Screen Mapper

Jerome E. Reuter

Take the drudgery out of screen set-up with this simple utility. The maps printed by the program make it easy to find the memory location for any character position on the screen. Works with the 64, 128, Plus/4, and 16 with any Commodore or compatible printer.

Designing a custom screen can be difficult. Trial and error is the strategy used by most programmers when designing menus and games. With "Screen Mapper," you can test screen designs on paper. Screen Mapper draws screen memory maps on your Commodore printer.

Screen Mapper is written in BASIC. Type it in and save a copy to tape or disk. The program is written for the 1525 (or other odd-numbered Commodore printers like the MPS-801 or 803). If you have a 1526 (or other even-numbered printer like the MPS-802) replace line 10 with

```
10 PR=0
```

Plus/4 and 16 users must make this change:

```
20 SM=3072:CM=2048
```

After you've saved the program, load it and type RUN.

Map Varieties

Screen Mapper makes three different kinds of maps, and each one can be printed in two sizes. When you run the program, these are the options that you'll see:

1 **Small Screen Map**
2 **Small Color Map**
3 **Small Graphics Map**
4 **Large Screen Map**
5 **Large Color Map**
6 **Large Graphics Map**
7 **Quit**

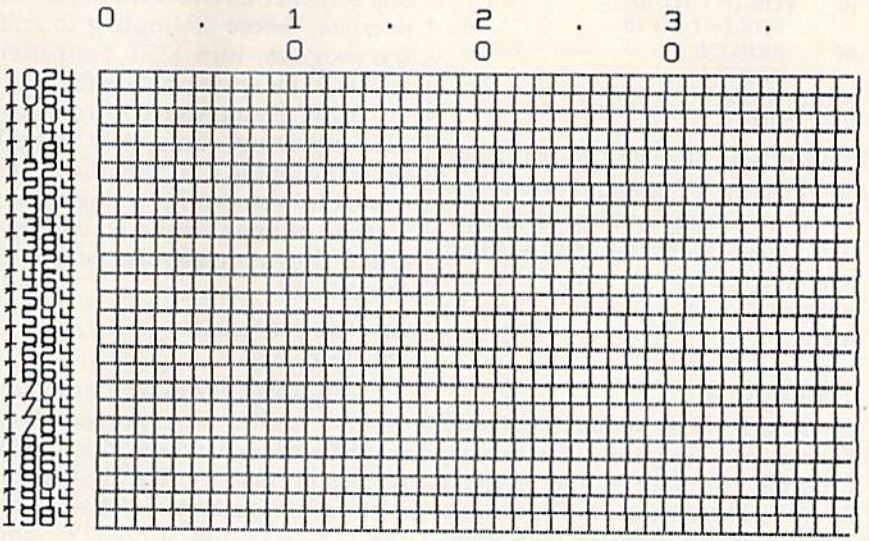
Before you choose an option, make sure your printer is connected properly and turned on.

If you request a screen map, each box in the map represents a character cell. Each row is labeled with a number that represents the address of the first character cell of that row. On the 64, the first row is numbered 1024. That means that the first box in that row is located in memory at 1024, the second at 1025, and so on. If you use this chart to POKE characters onto the screen, remember to POKE screen codes (not ASCII codes) onto the screen. As an example, POKE 1024,1 puts an *A* in the first character cell on the screen. A table of screen codes can be found in Appendix B (p. 376) of *The Commodore 64 Programmer's Reference Guide* or in Appendix G (p. 261) of *COMPUTE!'s Mapping the Commodore 64.*

Color maps are similar. POKE the color number into the byte specified by the color memory map. For example, POKE 55296,1 (on the 64) makes the character at the first character cell white.

The final map is a graphics map. This is not a memory map, but a representation of the graphics screen. Each box in the chart holds 100 hi-res pixels in a 10 × 10 configuration. Use this graph to make a rough sketch of the hi-res screen before starting any detailed work.

See program listing on page 102.



A sample printout of a small screen map (64 version).

LIST Formatter

Richard Richmond

This handy utility for the 64, 128, Plus/4, and 16 makes program listings more readable. It formats listings on the screen or to any printer.

Trying to follow the logic of a program is often difficult because of dense program lines and nested loops. This handy utility produces easy-to-read BASIC program listings. With "LIST Formatter" in place, multiple statement lines are split up and FOR-NEXT loops are indented to make it easier to follow the program flow. For example, if you type in the following program:

```
10 FOR I=1 TO 10:FOR J=1 TO 10
20 PRINT I:PRINT J
30 NEXT
40 NEXT
```

LIST Formatter displays it like this:

```
10    FOR I=1 TO 10:
        FOR J=1 TO 10
20      PRINT I:
        PRINT J
30      NEXT
40    NEXT
```

Notice how the FOR-NEXT loops are lined up. Programmers who use structured programming languages like Pascal, Modula-2, and C often use indentation to make the appearance of a program follow its logic.

Typing It In

There are three versions of LIST Formatter—Program 1 for the 64, Program 2 for the 128, and Program 3 for the Plus/4 and 16. Type in the appropriate version for your computer. The DATA statements contain a machine language program, so be sure to save a copy to tape or disk before trying to run the program. Load the program and type RUN. Type NEW to erase the BASIC loader from memory. You may then turn LIST Formatter on or off with the following commands:

	Formatter On	Formatter Off
64	SYS 53020	SYS 53023
128	SYS 3072	SYS 3075
+4/16	SYS 16150	SYS 16153

As an example, with the 64 version, you would type SYS 53020 to turn on formatted listings, and SYS 53023 to turn them off.

Since LIST Formatter breaks up program lines with more than one statement, screen editing is not possible. Before attempting to edit the program, turn LIST Formatter off with the appropriate SYS.

LIST Formatter controls the LIST command completely, but all functions of the LIST command are available. You can list a single line, a range of lines, or the whole program. The listing can also be sent to the printer:

```
OPEN 4,4:CMD4:LIST
PRINT#4:CLOSE 4
```

Machine language and advanced BASIC programmers may be interested in where this utility resides in memory. The 64 version is stored at locations 53020–53243; the 128 version at 3072–3293; and the Plus/4 and 16 version at 16150–16373.

See program listings on page 99.

Save Your Copies of COMPUTE!

Protect your back issues of *COMPUTE!* in durable binders or library cases. Each binder or case is custom-made in flag-blue binding with embossed white lettering. Each holds a year of *COMPUTE!*. Order several and keep your issues of *COMPUTE!* neatly organized for quick reference. (These binders make great gifts, too!)

Binders	Cases:
$8.50 each;	$6.95 each;
3 for $24.75;	3 for $20.00;
6 for $48.00	6 for $36.00

(Please add $2.50 per unit for orders outside the U.S.)

Send in your prepaid order with the attached coupon

Mail to: Jesse Jones Industries
P.O. Box 5120
Dept. Code COTE
Philadelphia, PA 19141

Please send me _____ COMPUTE! ☐ cases ☐ binders.
Enclosed is my check or money order for $ _____. (U.S. funds only.)
Name _____
Address _____
City _____
State _____ Zip _____
Satisfaction guaranteed or money refunded.
Please allow 4–6 weeks for delivery.

Easy Disk LOAD And SAVE

Joseph Heaverin

Several useful, time-saving options are added to the two most frequently used disk commands. For the 64 with a disk drive.

Since the 64 was introduced in 1983, Commodore has had a few opportunities—with the Plus/4 and 128—to improve disk commands. Among the features available on these newer computers are commands to load *and* run programs, and commands for saving machine language programs. Now you can bring these capabilities to the 64 with "Easy Disk LOAD and SAVE."

Easy Disk adds a few handy options to the 64's plain-vanilla LOAD and SAVE commands. With this program, it's easy to load and run BASIC and machine language programs, and to save machine language programs. Each of the new features is activated by adding a new secondary address value to a standard LOAD or SAVE statement. Here are the new commands and a description of what they do:

LOAD *"filename"*,8,2 loads and runs a BASIC program.

LOAD *"filename"*,8,3 loads and executes a machine language program.

SAVE "filename",8,1 saves and verifies a BASIC program.

SAVE *"filename"*,8,2, *start address, end address* + *1* saves a block of memory to disk. Use this to save machine language programs, screen images, sprite patterns, and the contents of other areas of memory. Note that the *end address* + *1* parameter should be one location greater than the actual ending address of the block of data you wish to save.

Activating The New Commands

Type the program in and save it to disk. Since there are many DATA statements which require accurate typing, use "The Automatic Proofreader" program found elsewhere in this issue. When you're ready to use the program, load it and type RUN. The top of BASIC pointer is moved down to protect enough memory to hold the program, then a machine language routine is POKEd into this reserved area. To enable the new commands, type NEW, then SYS *xxxx* where *xxxx* is the number that the program gave you when you ran it. It's a good idea to write down this SYS address—you'll need it to reenable the program after a RUN/STOP-RESTORE.

The new commands are now activated. As a test, put a disk with a BASIC program on it in your disk drive. Now type:

LOAD *"filename"*,8,2

Substitute the name of your BASIC program for the *filename* in the command above. It should load in and start automatically.

RUN/STOP-RESTORE disables the Easy Disk commands. Type the SYS given by the BASIC program to reenable them.

See program listing on page 106.

SONY
3.5" DISKETTES
Certified by Apple for MacIntosh™
• Safety Auto Shutter protects against fingerprints and dust
• Safety Auto Design is heat-resistant and guards against disk damage during handling

Price Per Diskette

	SS	DS
Box	1.09	1.59
Bulk	1.17	1.29

GUARANTEED 100% ERROR FREE

POLY PACK 5¼" DISKETTES
33¢ Each
• Blank Jackets
• WP Tabs
• Envelopes
100% ERROR FREE
Sold in Lots of 100 Only

QUALITY PRINTER RIBBONS
Apple Imagewriter ..... $3.95 ea
Okidata 80/82/83 ..... $1.49 ea
Epson LX 80/90 ..... $2.95 ea
Sold 6/Box (Minimum)
Min. Order $25.00. S&H: Continental USA: $4.00/100 or fewer disks; discount at 300. Ribbons $.25 each. Foreign orders APO/FPO, please call. MI residents add 4% tax. Prices subject to change without notice. Hours 8:30 AM - 7:00 PM.

VISA MasterCard

Precision Data Products™
P.O. Box 8367, Grand Rapids, MI 49518
(616) 452-3457 • Michigan 1-800-632-2468
Outside Michigan 1-800-258-0028

LIONHEART
BUSINESS & STATISTICAL SOFTWARE
PC/MS-DOS (5¼ & 3½), MACINTOSH, AM'GA ATARI ST, C-128, CP/M, APPLE DOS 3.3
Explanatory books with professional compiled software; the new standard for statistical use. The influential Seybold Report on Professional Computing has this to say about Lionheart "... our sentimental favorite because of its pragmatic approach to the basic statistical concepts... The thinking is that the computer merely facilitates the calculations; the important thing is to be able to formulate a problem correctly and to determine what type of analysis will be most valuable." Let Lionheart help you get ahead of the competition! Spreadsheet compatible.

• BUSINESS STATISTICS $145
• EXPERIMENTAL STATISTICS 145
• MULTIVARIATE ANALYSIS 150
• EXPLORATORY DATA ANALYSIS 75
• STATISTICS FOR MARKETING 150
• QUALITY CONTROL & INDUSTRIAL EXPERIMENTS 145
• FORECASTING AND TIME-SERIES 145
• SALES AND MARKET FORECASTING 145
• DECISION ANALYSIS TECHNIQUES 110
• LINEAR & NON-LINEAR PROGRAMMING . 95
• PERT & CRITICAL PATH TECHNIQUES ... 95
• OPTIMIZATION 110

VISA, MasterCard, Check, AMEX
P.O. Box 379, ALBURG, VT 05440
(514) 933-4918

computing for families

My Seven-Year-Old Hacker

Fred D'Ignazio
Associate Editor

My eyes popped open. The bedroom was dark, but I was wide awake. What time was it?

Four-thirty in the morning!

I gently slipped out of bed so as not to awaken my sleeping wife, and tiptoed down the hall corridor, making a beeline for my study. Since I was up, I thought I'd better write my GAZETTE column. My editor had called the day before and told me the column had to be in today. Maybe that's what had woken me up—fear and panic, and a guilty conscience!

I fired up the computer.

"My eyes popped open," I wrote. "The bedroom was...." Suddenly, who should appear in my study but my seven-year-old son, Eric. He wore only one sock, his hair was disheveled, and he had a strange, intense look on his face. "Time to play *Lode Runner*," he said with a grim little smile. "I want to see if I can get back to sixth level. I dreamt about it last...."

"But, Eric," I protested, pointing at the glowing red numbers on my digital clock, "it's only 4:47 in the morning! It's too early to play *Lode Runner*!"

"Daddy," he said calmly, "I *have* to get back to the sixth level." He turned around and headed for the Commodore 128 in the family room. A moment later I heard the disk drive whirring.

"Dumb game," I heard Eric mutter. It must have been hours later, but I knew what had happened. One of Eric's little *Lode Runner* men had gotten caught or squashed inside a stone wall. "Don't give up!" I called.

I went back to writing: "My eyes popped open. The bedroom was dark, but I was...."

No Keyboards

When Eric was little, every time he asked me to play with him I suggested we play a computer game. This worked for a while, but each time I suggested computers Eric liked the idea less and less.

I didn't pay any attention. I just kept pushing. It finally got so bad that one year when I told Eric I had bought him a terrific birthday present, he eyed me suspiciously and said, "It doesn't have a keyboard, does it?"

That comment did it. It really got to me. I realized that just because I was a computer addict, it wasn't necessary for my son to be one, too. I finally saw how my love for computers might be killing off any natural interest Eric had.

So the next time he asked me to play with him, I was ready. "How'd you like to go out in the backyard and saw some wood?" I suggested. When he looked at me funny I said, "Or we could climb on the roof and drop water balloons on Mommy and Catie. What d'you say?" (Liberated from my computer mania, I knew how to be a pal to my son.)

Math Blaster, Troggles, And Rabbits

For years Eric stayed wary of computers, and I was careful not to even mention computers around him. Then—from out of the blue—over the Christmas holidays, Eric suddenly got turned on to computer games. I've never seen anything like it.

During the two weeks Eric had off from school, he turned into a computer-game fanatic. He started by playing MECC Software's *Number Munchers* game. He graduated from "Factors" to "Prime Numbers" and "Inequalities," and then went on to play *Word Munchers*. Troll-like "Troggles" chased him across the screen as he munched words with long *i* sounds (as in *kite*), long *e* sounds (as in *treat*), and long *u* sounds (as in *mule*).

He went on and devoured The Learning Company's family of rabbits—*Reader Rabbit, Writer Rabbit,* and *Math Rabbit*. Then he blasted the smithereens out of whole generations of numbers with *Math Blaster!* from Davidson Software.

Next he journeyed into the world of text-and-graphics adventure games—notably, *Mystery House, Cranston Manor, Dragon's Keep, Gelfling Adventure,* and *Mickey's Space Adventure*—all from Sierra On-Line.

When he returned to earth, he took time off for a quick vegetable soup and grilled cheese sandwich.

Now he has become a full-time Lode Runner. I watch him racing up ladders, sprinting along high walls, and digging his way down to buried treasure boxes, and I marvel. Is this really my son—the one who hates computers?

I sneak back into my study. "My eyes popped open," I write. "The bedroom was dark, but I was wide awake. What time was it?"

Moving?

For address changes or subscription information, call toll free **800-247-5470** (in Iowa 800-532-1272).

hints & tips

A Simple Menu

Michael A. Lang

If you've discovered a clever time-saving technique or a brief but effective programming shortcut, send it to "Hints & Tips," c/o COMPUTE!'s Gazette. If we use it, we'll pay you $35. We regret that, due to the volume of items submitted, we cannot reply individually to submissions.

The 128's BASIC 7.0 has many new commands. If you've been programming for a long time on the 64, it may take a while to break some old programming habits that are no longer efficient in 128 mode. As a case in point, let's look at menu selection. Suppose we wanted to create this menu:

```
D—Dog
C—Cat
B—Bird
H—Hamster

Choose an animal
```

We want the user of the program to press one of the letters *D*, *C*, *B*, or *H*. How would we do this on the 64?

The easiest solution is to change the rules. Instead of having the user type a letter, have him type a number. Then use ON/GOSUB to jump to the appropriate routine.

```
10 PRINT "1—DOG"
20 PRINT "2—CAT"
30 PRINT "3—BIRD"
40 PRINT "4—HAMSTER"
50 PRINT:PRINT"CHOOSE AN
   ANIMAL"
60 INPUT AN:IF AN<1 OR AN>4 THEN
   60
70 ON AN GOSUB 1000,2000,3000,4000
80 GOTO 10
1000 REM DOG ROUTINE
1999 RETURN
2000 REM CAT ROUTINE
2999 RETURN
3000 REM BIRD ROUTINE
3999 RETURN
4000 REM HAMSTER ROUTINE
4999 RETURN
```

This is a common solution, but we've sidestepped more of the problem than we've solved. Still in 64 mode, let's solve the problem as it was stated.

```
10 PRINT "D—DOG"
20 PRINT "C—CAT"
30 PRINT "B—BIRD"
40 PRINT "H—HAMSTER"
50 PRINT: PRINT"CHOOSE AN
   ANIMAL"
60 AN=0:INPUT AN$
61 IF AN$="D" THEN AN=1
62 IF AN$="C" THEN AN=2
63 IF AN$="B" THEN AN=3
64 IF AN$="H" THEN AN=4
65 IF AN=0 THEN 60
70 ON AN GOSUB 1000,2000,3000,4000
80 GOTO 10
1000 REM DOG ROUTINE
1999 RETURN
2000 REM CAT ROUTINE
2999 RETURN
3000 REM BIRD ROUTINE
3999 RETURN
4000 REM HAMSTER ROUTINE
4999 RETURN
```

Unfortunately, this program is longer than the first. While this may be an adequate solution if there is only one menu in the program, it would become unwieldy in a longer program with many menus.

INSTR Finds The Solution

In 128 mode, the answer to the problem comes to us in the form of the INSTR function. This function searches through a string, looking for another string of the same size or smaller. For example, PRINT INSTR("DON'T FEED YOUR BIRD TO YOUR CAT.","BIRD") would print the number 17, because the word BIRD begins at character position 17 in the string DON'T FEED YOUR BIRD TO YOUR CAT (remember that spaces and the apostrophe count as characters, too). If INSTR can't find a match, it returns a 0. PRINT INSTR("HAMSTERS EAT HAMSTER FOOD","CAT") would print 0.

Let's use INSTR in our menu program:

```
10 PRINT "D—DOG"
20 PRINT "C—CAT"
30 PRINT "B—BIRD"
40 PRINT "H—HAMSTER"
50 PRINT:PRINT"CHOOSE AN
   ANIMAL"
60 INPUT AN$
61 AN=INSTR("DCBH",AN$)
62 IF AN=0 THEN 60
70 ON AN GOSUB 1000,2000,3000,4000
80 GOTO 10
1000 REM DOG ROUTINE
1999 RETURN
2000 REM CAT ROUTINE
2999 RETURN
3000 REM BIRD ROUTINE
3999 RETURN
4000 REM HAMSTER ROUTINE
4999 RETURN
```

In this program, INSTR searches through the menu string DCBH to find the input. We can use the insight given to us by this solution to make the 64 version shorter:

```
10 PRINT "D—DOG"
20 PRINT "C—CAT"
30 PRINT "B—BIRD"
40 PRINT "H—HAMSTER"
50 PRINT:PRINT"CHOOSE AN
   ANIMAL"
60 AN=0:INPUT AN$
61 FOR I=1 TO 4:IF AN$=MID$
   ("DCBH", I,1) THEN AN=I
62 NEXT I
63 IF AN=0 THEN 60
70 ON AN GOSUB 1000,2000,3000,4000
80 GOTO 10
1000 REM DOG ROUTINE
1999 RETURN
2000 REM CAT ROUTINE
2999 RETURN
3000 REM BIRD ROUTINE
3999 RETURN
4000 REM HAMSTER ROUTINE
4999 RETURN
```

Here, we've simulated the INSTR function by using the MID$ function within a loop.

BASIC for beginners

GOTO and GOSUB

Larry Cotton

This month we'll take a close look at two BASIC statements—GOTO and GOSUB. But first, let's take a look at the easiest and perhaps the most practical BASIC statement to use: REM.

REM stands for *remark*—use it whenever you want to make notes to yourself within a program. When the computer gets to a REM, it immediately skips ahead to the next program line, disregarding anything that follows on the same line as the REM—including valid BASIC statements. We'll use REM in this month's final programming example.

So far I haven't said very much about programming style, but it should be obvious that it's important to write understandable programs. You'd be surprised how easy it is to become lost in a long program.

Short programs which use GOTO are easy to follow—we've already used the command in several short programs. But when a program becomes long and complex, the overuse of GOTO statements can weave a tangled web. Sometimes, though, a GOTO may be the best solution to a problem.

Using GOTO

In February, we learned that GOTO sends control of a BASIC program to another line. The line number may be the same as, less than, or greater than the one containing the GOTO.

Some people put a space between the words GO and TO. Commodore BASIC understands that GO TO is the same as GOTO, but you shouldn't make a habit of using this form, since it isn't acceptable in any other version of BASIC.

Perhaps the simplest use of GOTO is to put the computer into a "do-nothing" loop. Short of turning off the computer, the only way to exit such a loop is by using the RUN/STOP key.

```
10 INPUT "YOUR NAME"; N$
20 PRINT: PRINT N$
30 GOTO 30
```

This program waits for a name to be typed, then it skips a screen line and prints the name. Without line 30, the program would end with READY and a flashing cursor. But line 30 puts the computer into an *infinite loop*. This is especially useful in short demo programs that depend on the screen not being spoiled by a READY message.

The above program is a trivial example of using GOTO to repeat an action or series of actions—it repeats the GOTO. By looping back further, we can repeat a more useful action. For instance, we can print an indefinite number of messages:

```
10 PRINT "DEMO"
20 GOTO 10
```

Or, using IF-THEN and what appears to be an impossible bit of algebra, we can print a finite number of messages:

```
10 PRINT "DEMO"
20 T = T + 1: IF T < 8 THEN GOTO 10
```

This program *loops* eight times, each time increasing the value of the variable T. However, there's a better way:

```
10 FOR T = 1 TO 8
20 PRINT "DEMO"
30 NEXT
```

Although there's no GOTO, this program works identically to the one above, except that it's faster. It's also easier to understand.

Here's another common use of GOTO:

```
10 INPUT "NUMBER LESS THAN 8"; N
20 IF N >= 8 THEN GOTO 10
30 (program continues here)
```

If the user responds to the INPUT with a number greater than or equal to eight, the computer goes back to line 10 again for another try.

When run, the above program will continue to loop forever until a number less than eight is typed in.

I've mentioned this before, but it's worth repeating: In BASIC statements which could use both IF-THEN and GOTO, the programmer always has many ways to write the code. Here's another example of that rule:

```
10 INPUT "NUMBER OF CARDS IN A
   DECK";C
20 IF C <> 52 THEN GOTO 10
30 (program continues here)
```

Line 20 could have been:

```
20 IF C <> 52 THEN 10
```

or:

```
20 IF C <> 52 GOTO 10
```

Here's an example which shows how a program's flow can be altered depending on the response to a multiple-choice question:

```
10 INPUT "PICK A NUMBER FROM 1
   TO 4";N
20 IF N=1 GOTO 70
30 IF N=2 GOTO 80
40 IF N=3 GOTO 90
50 IF N=4 GOTO 100
60 GOTO 10
70 (program continues here)
```

Line 60 contains a GOTO which sends program control back to line 10 if the response doesn't fall within the required range. Lines 70–100 would contain appropriate actions for the four possible responses.

Subroutines

GOSUB is similar to GOTO in that it transfers control of a program to another line. (In case you're wondering, you can't break up the word and spell it GO SUB.) The line to which control is transferred is the first line of a *subroutine*.

A subroutine is often used when some segment of the program is used repeatedly, such as a pause, a sound effect, a certain screen display, or an input procedure.

The final line of a subroutine must contain the BASIC command

RETURN. This command transfers control back to whatever statement immediately follows the GOSUB that called the subroutine. It's possible for a subroutine to consist of only one line with RETURN as the last statement on the line.

GOSUBs have several advantages:

- They shorten programs, thus conserving memory.
- They make programs more structured, and therefore easier to understand.
- They save typing.

Type in this simple example which uses a time delay subroutine.

```
10 PRINT "{CLR}"
20 PRINT "THIS IS"
30 GOSUB 100
40 PRINT "A DELAYED"
50 GOSUB 100
60 PRINT "MESSAGE": END
100 FOR T=1 TO 500: NEXT: RETURN
```

Now type RUN and press RETURN. The screen clears and a message is printed, line by line, with a pause between each—the subroutine at line 100 is used twice.

END appears at the end of line 60 to prevent the time delay from occurring again—and for a very good reason. Remove the END and type RUN. You'll see a error which is encountered when subroutines are improperly given control—RETURN WITHOUT GOSUB. The computer is trying to return to a BASIC statement right after a GOSUB, but in this case it wasn't a GOSUB that transferred control to line 100, thus BASIC gives an error.

Lines within a subroutine may call other subroutines and thus be nested. This is similar to the nesting of FOR-NEXT loops. Try the following program, which demonstrates several things we've covered in this and past columns.

```
PG 10 PRINT"{CLR}": REM CLEAR
      {SPACE}SCREEN
MS 20 A$="":INPUT"{DOWN}FIRST
      {SPACE}INITIALS";A$
MX 30 IF A$="" THEN END
FQ 40 INPUT"{DOWN}SECOND INITI
      ALS";B$
RH 50 PRINT"{CLR}": REM CLEAR
      {SPACE}SCREEN AGAIN
EB 60 FOR T=1 TO 4: PRINT: NEX
      T: REM MOVE CURSOR DOWN
      {SPACE}FOUR LINES
ED 70 GOSUB 140: REM DRAW FIRS
      T BOX
SA 80 PRINT"{2 RIGHT}"A$"
      {3 DOWN}": REM PRINT FIR
      ST INITIALS
KS 90 GOSUB 200: REM DELAY AFT
      ER PRINTING FIRST INTIAL
      S
AM 100 GOSUB 140: REM DRAW SEC
      OND BOX
SP 110 PRINT"{2 RIGHT}"B$"
      {3 DOWN}": REM PRINT SE
      COND INITIALS
MX 120 GOSUB 200: REM ANOTHER
      {SPACE}TIME DELAY
DH 130 GOTO 10: REM SEND CONTR
      OL BACK TO BEGINNING OF
       PROGRAM
QQ 135 REM YOU CAN MAKE NOTES
      {SPACE}TO YOURSELF ANYW
      HERE YOU WANT.
PG 136 REM AS LONG AS THEY STA
      RT WITH REM, THE COMPUT
      ER TOTALLY IGNORES THEM
      .
BC 137 REM LINES 140-190 ARE T
      HE BOX-DRAWING SUBROUTI
      NE
FP 140 PRINT"{A}*****{S}": REM
       TOP OF BOX
GP 150 FOR T=1 TO 3:PRINT"B
      {5 SPACES}B":NEXT: REM
      {SPACE}SIDES OF BOX
AG 160 PRINT"{Z}*****{X}": REM
       BOTTOM OF BOX
HQ 170 GOSUB 200: REM DELAY AF
      TER DRAWING BOX
BR 180 PRINT"{4 UP}": REM MOVE
       CURSOR UP 4 LINES
PK 190 RETURN: REM SEND CONTRO
      L BACK TO RIGHT AFTER G
      OSUB THAT SENT IT HERE
SK 200 FOR T=1 TO 500:NEXT:RET
      URN: REM DELAY LOOP SUB
      ROUTINE
```

This program illustrates the usefulness of REMs. They should be used freely in your programs. There are two small disadvantages in using REMs—they use up memory (about one byte for each letter in the message), and they may slow a program down slightly. Some programmers keep two versions of their large programs—one with REMs and one without.

Program Notes

Lines 10–60 should be clear except for lines 20 and 30, which allow the user to get out of an INPUT statement by pressing only the RETURN key INPUT expects you to type something. You can't get out of it by pressing the RUN-STOP key. Line 30 tells us: "IF the user presses only the RETURN key instead of entering an initial, THEN end this program."

The program sees its first GOSUB at line 70—the GOSUB to the box-drawing subroutine which starts at line 140 and ends at line 190. Note that before the subroutine gets to the RETURN at line 190, it goes through another nested or imbedded subroutine—only one line long—at line 200. This is the same time-delay loop that we saw in our first programming example.

When RETURN is encountered at line 190, the program scoots back to where it left off—the middle of line 70. There's nothing there but a REM, so the program skips ahead to line 80 where A$ (the first set of initials) is printed in the box. Line 90 sends the program to the time-delay subroutine at line 200 again.

Lines 100–120 are similar to 70–90, except that the second set of initials—B$—are printed in another box.

Lines 140–190 comprise the box-drawing subroutine, and line 200 is the time-delay loop.

Now I'll explain why line 20 begins with A$="". If it were omitted, you would not be able to end the program by pressing only the RETURN key the second (and subsequent) time through the program.

When you start a program by typing RUN, its numeric and string variables are set to zero and *empty* strings, respectively.

But since GOTO 10 (line 130—the last active line in the program before the subroutines) isn't the same as a RUN command, the variable A$ remains as it was the previous time through the program. Thus A$ must be set to an empty string for every loop through the program except the first one, and it doesn't hurt to do it then.

B$ isn't set to an empty string since once the first initials are typed in, it's assumed the second will be also.

The best way to understand anything is to try it. So move the cursor up to line 20, edit A$="" out of the line, press RETURN, and run the program again.

Play with these concepts. Next month we'll look at a way to replace a series of IF-THEN statements.

machine language for beginners

Between BASIC And Machine Language

Richard Mansfield
Editorial Director

Among the important benefits of machine language (ML) are the impressive improvements it can make to the speed of programs written in other languages. It's quite common for BASIC or C programmers to write first in the higher-level language and then rewrite certain sections in ML. There are even analysis programs which can run a C program and then report that, for example, it spends 73 percent of its time in a loop at line 548. You then replace that loop with ML, and the new hybrid program is far more swift.

Many games, too, are part BASIC and part ML; animation effects usually *must* be ML. Let's see how to attach ML to BASIC and, in the process, learn a little about two obscure ML instructions: ASL and LSR. You don't often need them, but when you do, they come in quite handy.

Here's our hybrid:

```
XK 10 DATA169,0,10,96,169,0,74
      ,96
CQ 20 FORI=874TO881:READM:POKE
      I,M:NEXT
MR 30 PRINT:INPUT "NUMBER BETW
      EEN 0-255";A
PD 40 GOSUB 80:PRINT
SX 50 INPUT"1.ASL 2.LSR ";Y:ON
      YGOTO60,70
JH 60 POKE875,A:SYS 874:A=PEEK
      (780):GOSUB80:GOTO30:REM
       128 USERS PEEK(6)
HX 70 POKE879,A:SYS 878:A=PEEK
      (780):GOSUB80:GOTO30:REM
       128 USERS PEEK(6)
HE 80 X=A:P=128:PRINTX,:FORI=1
      TO8
AG 90 IF INT(X/P)=1THENPRINT"1
      ";:X=X-P:GOTO110
BD 100 PRINT"0";
HD 110 P=P/2:NEXTI
MR 120 RETURN
```

Note that 128 users must change the PEEK(780) in lines 60 and 70 to PEEK(6).

Since the ML portion of this program is so short, it's convenient to just include it as part of the BASIC program (in the DATA statement) and POKE it into RAM with line 20. You'll often see BASIC programs in the GAZETTE which have a zone of DATA which is POKEd into memory and becomes, then, an ML subroutine to which the BASIC program will, at times, SYS. Locations 874–881 were used to store the ML for this program because that's an area which is safe on the 64 and works in this case on the 128. However, 128 users should be aware that this area is used during disk and tape access on the 128, and wouldn't be secure were a program to open any files. Users of the 128 can safely store small ML programs in the 256 bytes between addresses 2816–3072.

If you type this program in, you will see that it asks you for a byte-sized number (0–255) and then shows you what the number looks like in binary (as the bits within your byte). Bits are read from *right to left*, so 00000010 is the number 2, 00000001 is 1, and 00000011 is 3. Notice that each digit as you move left represents twice as much as the previous one. The bit position values (from left to right) are 128, 64, 32, 16, 8, 4, 2, 1. They are cumulative, so if the first and fifth bits are turned on (00010001), your byte holds the number 17.

Shifting Left And Right

Next, the program asks if you want your number ASLed or LSRed. ASL means *Arithmetic Shift Left*, and all it does is move all eight bits in a byte over to the left by one place: 00000100 (4) becomes 00001000 (8), and so forth. A 0 is moved into the rightmost bit. If ASL causes a 1 to fall off to the left, that 1 is put into the Carry Flag (so you could test to see if your result were higher than 255). What's valuable about ASL is that it's a quick way to multiply a number by 2. And ASL:ASL multiplies by four: 00000011 (3) becomes 00000110 (6) after the first ASL and then 00001100 (12) after the second ASL. In this way, you can multiply by any number by combining ASL with addition. To multiply by 3, save the original number, ASL, and then add them together: STA 4000:ASL:CLC:ADC 4000. (You always need to clear the Carry Flag—CLC—before any addition unless you are working with multiple-byte multiplication. Also, you can use any vacant RAM byte for temporary storage; we just picked 4000 at random.)

LSR (Logical Shift Right) moves bit 1 to the right (thereby *dividing* the number in a byte by 2). LSR puts a 0 into the leftmost bit (the highest value bit), pushes all the other bits to the right, and if a 1 drops off the right side, it's put into the Carry Flag.

Sending Numbers To ML

After you type in a number, our BASIC program prints it on screen using the subroutine at line 80. First we want to make X = A so we can preserve the value you typed into A for use later in the program during the ASL or LSR. We'll take X eight times through a loop in this subroutine, pick off each bit, and print it on screen as a 1 or 0. The first time through the loop we check to see if 128 will divide into X. If it does, the 128 bit will be turned on, so we print a 1 and subtract 128 from the number. Each time through we divide P by 2 so that we can repeatedly test X from 128 down through all eight possible bit positions.

Assume the user chooses to ASL the number 34. In line 60, 34 is POKEd directly into the machine language program (obliterating the 0 which our DATA line had stored as a place marker at address 875). This is one way to insert a single byte into an ML program from BASIC. (We'll look at an even easier ways in a moment.) Let's see what the ML program looks like:

```
169 0 LDA #0
10    ASL
96    RTS
169 0 LDA #0
74    LSR
96    RTS
```

Notice that our ML routine is initially set up to put a number directly (using the special *immediate* addressing mode signified by the # symbol) into the accumulator prior to ASLing that number. However, before SYSing to this routine, we POKE a 34 right on top of the 0, so when we SYS, the 34 will be ASLed and we will return to BASIC where we left off (RTS means *ReTurn from Subroutine*). Likewise, the #0 after that second LDA is just a place marker which will be POKEd over by our chosen number prior to an attempt to LSR.

These two small ML routines are stuck together in memory at addresses 874 and 878, and we select them from BASIC by simply SYSing to the address which performs the service we require.

But how do we get the number back from the accumulator once we're returned to BASIC? After our 34 (00100010: a 32 and a 2) has been LSRed into 00010001, it sits in the accumulator, but we promptly RTS back to BASIC without making any special provisions to send the number from the accumulator to some storage place where we can PEEK it. (You can't PEEK the accumulator, X, or Y registers from BASIC.) Fortunately, when you leave an ML routine, your computer saves these three registers and the Status Flag byte in four consecutive addresses that you *can* peek: 780, 781, 782, and 783 hold A, X, Y, and the Status Flags, respectively, on the 64. On the 128 they will be in addresses 6, 7, 8, and 9.

However, these special locations are a two-way street. You can POKE something into them *before* you SYS to the ML routine, and what you POKE will end up in the proper registers. So we could adjust our program by eliminating the place-holding LDA #0 and simplifying the ML to this:

```
10  ASL
96  RTS
74  LSR
96  RTS
```

With this method, we would first POKE our variable number A into address 780 (for the 64) or 6 (for the 128) just before SYSing. This would eliminate the need to POKE directly into the ML routine itself.

If you use a 128, there's a third and yet more efficient way to send numbers from BASIC to ML. Simply append the things you want passed to the registers directly onto the SYS command itself:

SYS 3072,15,2,66 (puts 15 in the accumulator, 2 in X, and 66 in Y)

SYS 3072,B,A(1) (puts the number in variable B into the accumulator and the number in A(1) into X)

SYS 3072,,,5 (puts 5 into the Y register)

Also, there is a special command in 128 BASIC which allows a quick PEEK of the values left in the registers after you've RTSed back to BASIC: RREG A,X,Y or RREG Z,Q,F. The accumulator value is put into the first variable, X into the second, and Y into the third. Thus, you could replace the statement A = PEEK(6) in lines 60 and 70 of the 128 version of the example program with RREG A.

COMPUTE!'s Gazette Subscriber Services

Please help us serve you better. If you need to contact us for any of the reasons listed below, write to us at:

COMPUTE!'s Gazette
P.O. Box 10957
Des Moines, IA 50340

or call the Toll Free number listed below.

Change of Address. Please allow us 6–8 weeks to effect the change; send your current mailing label along with your new address.

Renewal. Should you wish to renew your Gazette subscription before we remind you to, send your current mailing label with payment or charge number, or call the Toll Free number listed below.

New Subscription. A one-year (12-month) U.S. subscription to *COMPUTE!'s Gazette* is $24 (2 years, $45; 3 years, $65. For subscription rates outside the U.S., see staff page). Send us your name and address or call the Toll Free number listed below.

Delivery Problems. If you receive duplicate issues of *COMPUTE!'s Gazette*, if you experience late delivery, or if you have problems with your subscription, please call the Toll Free number listed below.

COMPUTE!'s Gazette
1-800-247-5470
In IA 1-800-532-1272

Free Spirit Software, Inc.

538 S. Edgewood
La Grange, IL 60525
(312) 352-7323

1541/1571 DRIVE ALIGNMENT

Avoid costly repair bills! Perform your own alignment. 1541/1571 Drive Alignment diagnoses and reports the alignment condition of the disk drive as you perform adjustments. An on-screen HELP menu is available while the program is running. Full documentation includes section on how to load Alignment program even when the drive is badly misaligned. Auto-boots to all modes. Works on 1541, 1571 in 1541 or 1571 mode, C64 or C128 in 64 or 128 mode. Only $34.95!

SUPER DISK LIBRARIAN

A full featured disk cataloging and library system for the C128 in 128 mode. With one keypress all programs on a disk are cataloged. Catalog up to 1000 disks and 15,200 program names! Operates in fast mode with 80 column display. Catalogs 1541, 1571 and CP/M Plus formatted disk directories. Reads heavily protected disks! Printer output includes library index, full library report, master program list, category program list and disk labels. Also contains full featured disk utilities section including all CBM DOS commands plus rename a disk, copy protect a disk, change disk format without affecting data & much more! Fully documented. Organize your disk library & more for only $29.95!

MUSIC OF THE MASTERS

Free Spirit's highly acclaimed Music of the Masters series is a must for all music lovers. An hour of classical music per disk for the C64 or the C128 in 64 mode.
Music of the Masters I - Handel, Haydn, Mozart, Bach, Beethoven & many others!
Music of the Masters II - Minuets, waltzes, sonatinas & more from Bach, Brahms, Beethoven, Chopin, Schubert & many others.
Music of the Masters III - Mostly Mozart.
Music of the Masters IV - Best of Bach.
Music of the Masters V - Popular themes from the greatest & best known works of the Masters.
$9.95 per disk, 2 for $17.95, 3 for $24.95, 4 for $31.95, order all 5 disks for only $38.95!

The Great War - WWI strategy game for the C128 in 128 mode and 1571 disk drive. **Armies** of 17 countries represented. Hundreds of hours of challenge. Disk - $29.95

BASICally Simple 64 - How to use all basic 2.0 commands in Basic programs. Disk - $14.95

BASICally Simple 128 - How to use all Basic 7.0 commands in Basic programs. Disk - $19.95

Programmer's Notebook - High speed storage & retrieval system designed specifically for the programmer. Index magazine articles, programming routines or other computer related information. For the C128 in 128 mode. Disk - $19.95

Mr. Quizzer - Program to prepare quizzes as a general aid to learning. Prepare multiple choice, vocabulary, spelling, T-F, or general question-answer tests. Works on C64, C128 in either 64 or 128 mode, 40 or 80 column display, 1541 or 1571 disk drive, Commodore & compatible printers. Disk - $19.95

Free shipping & handling! Immediate delivery! Illinois residents add 8% sales tax. Send check or money order to:

Free Spirit Software, Inc.
538 S. Edgewood
La Grange, IL 60525

Countdown Timer

Dave Flater

Here's a clever routine that makes the 64 or 128's internal clock count backward. It becomes a countdown clock that you can easily use in your own BASIC programs—a nice addition for realtime games.

If you've ever tried to make a countdown clock in BASIC, you'll know that it's difficult to make a good one. The only timer that BASIC recognizes is one that counts upward. Try this short program to see how the internal clock works:

```
90 PRINT"{CLR}"
100 TI$="000000"
110 PRINT "{HOME}";TI$
120 IF TI$<>"000100" THEN 110
```

The variable TI$ is a *reserved variable* that is maintained by the system. It counts up from zero when the computer is turned on. Another reserved variable is the numeric variable TI. Replace TI$ with TI in the above program to see the difference. While TI$ counts seconds that go by, TI counts 1/60 second intervals known as *jiffies*. "Countdown Timer," a machine language subroutine that you can use in your own BASIC programs, makes the system timer count down instead of up. Both TI$ and TI are affected by this change.

Counting Down

There are two versions of Countdown—Program 1 for the 64 and Program 2 for the 128. Type in the version for your computer. Since there are several DATA statements, which require accurate typing, use "The Automatic Proofreader" program found elsewhere in this issue. When you've finished typing in the program, be sure to save a copy to disk or tape before running it. Now load the program with a statement of the form LOAD"COUNTDOWN",8. (Use ,1 if you're using tape instead of disk.) Substitute for COUNTDOWN the name you used when you saved the program.

If you run this program, you won't be able to see any changes. However, a machine language program is in memory, ready to be used. To see the clock count down, type these lines with the program in memory:

```
90 PRINT"{CLR}"
100 SYS 679:REM SYS 3072 FO
    R 128
110 TI$="000100"
120 PRINT "{HOME}";TI$
130 IF TI$<>"000000" THEN 120
```

This program starts a one-minute countdown. When the clock reaches 000000, the program ends. Although this particular program stops when the clock reaches zero, the timer doesn't. It *wraps around* to a high number and counts down to zero again. This is something to keep in mind when writing your own programs that use Countdown. If you don't check the clock at least once a second, zero may come and go without your program noticing.

To use the timer, include the appropriate version (Program 1 for the 64 or Program 2 for the 128) in your own program. To make the timer count down, include a line in your program like this:

100 SYS 679:REM for the 64

or

100 SYS 3072:REM for the 128

See program listings on page 107.

COMPUTE!'s GAZETTE
TOLL FREE
Subscription
Order Line
1-800-247-5470
In IA
1-800-532-1272

DISK LIQUIDATION!
PREMIUM QUALITY! 5 YEAR WARRANTY!

THE BIG DISKETTE MAKERS ARE PANICKING! The price cuts in the diskette market have forced top makers to sell off their inventory at pennies! These disks are not seconds, not cosmetic rejects, only top-of-the-line highest quality disks, available to you at a fraction of the original selling price! Guaranteed 100% error-free, money-back satisfaction guarantee, five year replacement warranty! We can't print the makers, but you'll recognize them as among the highest quality, premium disks made! All disks meet or exceed ANSI standards, 50% clipping level, 9.5 mil jackets!

From 28¢ ea

5¼" DS/DD UNIVERSAL DISKETTE FOR IBM-PC/XT & COMPATIBLES, APPLE II SERIES, ATARI, TRS-80.

#4101	Boxed in 10's w/slvs/lbls/tabs	$4.20/box (42¢/disk)
#4102	Boxed in 25's w/slvs/lbls/tabs	$10/box (40¢/disk)
#4103	Boxed in 100's w/slvs/lbls/tabs	$38/box (38¢/disk)
#4104	Bulk packed in 100's w/lbls/tabs	$34/box (34¢/disk)
#4105	Bulk packed in 1000's w/tabs	$280/case (28¢/disk)
#UC2JA	Assorted color disks, w/lbls/slvs/tabs	25/$19.75 (79¢/disk)
#UAT1	Hi-density for the "AT", w/lbls/slvs/tabs	25/$42.25 ($1.69/disk)

3½" DISKS FOR THE MACINTOSH, AMIGA, IBM-PC 3½", ALL ARE COMPLETE WITH LABELS FOR NOTATIONS.

#UD3D	Single side, packed in 10's	$13.90/pack ($1.39/disk)
#UD3J	Single side, packed in 25's	$32.25/pack ($1.29/disk)
#UD3H	Single side, packed in 100's	$119/pack ($1.19/disk)
#UD3K	Single side, packed in 1000's	$990/case (99¢/disk)
#UD6D	Double side, packed in 10's	$15.90/pack ($1.59/disk)
#UD6J	Double side, packed in 25's	$37.25/pack ($1.49/disk)
#UD6H	Double side, packed in 100's	$139/pack ($1.39/disk)
#UD6K	Double side, packed in 1000's	$1190/pack ($1.19/disk)

30 Day Money Back Satisfaction Guarantee

COLOR DISK ASSORTMENT, 25 disks w/slvs, DS/DD, #UC2JA 25/$19.75 (79¢ea)
PAPER SLEEVES for 5¼" disks, plain white #SLV 100/$4 (4¢ each)
TYVEK SLEEVES for 5¼" disks, plain white #TYV 100/$6 (6¢ each)
5¼" CLEANER KIT, cleaner disks & solvent for 15 cleanings! #HCK $4.95
3½" CLEANER KIT, cleaner disks & solvent for 15 cleanings! #HCK3 $5.95
80 COLUMN +64K RAM CARD FOR APPLE IIe, guaranteed compatible #80COLR $3

HOW TO ORDER: Order by phone or mail, pay by MC/Visa/Amex/Discover/COD (no add'l charge for credit cards), send check with order, or COD ($3 addn'l). Minimum order $20. UPS Shipping/Handling add $3. Canada, FPO/APO's, or PO Box numbers include $6 shipping/handling. All orders must include daytime phone number. (We can ship open acct to schools, min order $100. Call 617-868-5515 for school orders.) Massachusetts residents add 5% sales tax. 30-day money-back satisfaction guarantee!

UNITECH 24-Z Thorndike Street Cambridge, MA 02141-1882 In Mass (617)868-5510
24 hours-a-day 7 days-a-week!
(800) 343-0472

AN OPPORTUNITY UNLIKE ANY OTHER

The nation's largest computer camp offers all traditional camping activities and camaraderie in a beautiful setting. Your child will have exclusive use of a major brand microcomputer for at least 6 hours every day.

An experienced staff ratio of one to three and a computer ratio of one to one uncaps the creativity of young people. Students receive hands-on experience in robotics, graphics, lasers, sound, languages, telecommunications and more.

Complete details on the 1, 2, 4, and 8 week coed sessions for ages 8-18 are available in a free brochure. Call or write for yours!

Call (317) 297-2700 or write to
MIDWEST COMPUTER CAMP
9392 Lafayette Road, Unit C5, Indianapolis, IN 46278

Todd Heimarck
Assistant Editor

If you typed in the memory display program from last month, load it into your 64 and get ready to take a look at a BASIC program. After loading it, type NEW. Then type in this short program and run it:

```
1 REM FIRST LINE
2 PRINT"LINE 2"
10 X1=1:X2=2:X4=4:X8=8
20 GG=9:GG%=9:GG$="NINE"
30 FORJ=1TO10:HH%(J)=J:NEXT
```

To start up the memory display program, SYS 49152. Take a look at location $002B (press the English pound symbol and enter 002B). Write down the first four numbers on the screen. They're pointers to the start of BASIC and the start of variables. When I typed in the BASIC program above, the four numbers starting at $2B were 01, 08, 69, and 08.

Hex Isn't Magic

Before we proceed, a word about hexadecimal. Hex is a numbering system that's convenient to use in certain situations. It uses base 16. Hex digits include the numbers 0–9 as well as the letters A–F. $A is the hex equivalent of 10, $B is 11, and so on, up to $F, which is 15. It's a common practice to mark hex numbers with a leading dollar sign. Thus, 88 means 88, but $88 means 136 (8 times 16 plus 8).

Remember that there's a difference between a value and the numerals used to express that value. Twelve pencils, a dozen pencils, and $0C pencils are the same. Twelve equals a dozen equals $0C.

If $88 is the same as 136, why use hexadecimal at all? Even though it seems more confusing, it's sometimes actually easier to use hex. If the memory display program is running and location $002B is still on the screen, the numbers 01 08 form a pointer to the start of the BASIC program. To decode this pointer in decimal, multiply the second number by 256 and add the first number. (On the 64 and 128, the low byte usually comes before the high byte.)

What the 01 08 means is that BASIC starts at 2049. In hex, the number is $0801. The decimal translation of 69 08 is 2153, $0869 in hex. When you're looking at pointers like this, translating 01 08 to $0801 and 69 08 to $0869 is much easier—you just flip the two numbers—than multiplying by 256 and adding.

Tokens And ASCII

We know that the BASIC program starts at $0801, so press the English pound key and enter that address. If you typed in the BASIC program above, you should see something that looks like this:

```
0801  10 08 01 00 8F 20 31 53
0809  54 20 4C 49 4E 45 00 1E
0811  08 02 00 99 22 4C 49 4E
```

That's what part of the BASIC program in memory looks like. Each program line starts with four bytes: two 2-byte numbers. The first is the *line link*, which points to the beginning of the next line, the second is the line number. At $0801, line 1 has the two numbers $0810 and $0001, which means the next line starts at $0810 and the line number is 1. At $0810, the numbers are $081E (the next line) and $0002 (the line number). Line 10 begins with $0836 and $000A ($A translates to decimal 10). Every line ends with a zero, and the final line link consists of two zeros to mark the end of the program.

The text of the program line falls between the four bytes at the beginning and the zero at the end. If you compare the ASCII on the right with the original lines, you'll see many of the characters you typed. But the REM seems to have disappeared from line 1 and the PRINT in line 2 has vanished.

The first byte after the line number in line 1 is $8F. That's the one-byte token for the REM statement. The first byte in the second program line is $99, the token for PRINT. On the 64, when you type in a line, it's *tokenized* before it's stored in memory. Every BASIC keyword has a token that lies in the range 128–255 ($80–$FF). On the 128, tokens may be either one or two bytes long, but on the 64, they're all single bytes.

Further down in memory, you'll see that line 30 is full of tokens—one each for FOR, =, TO, =, and NEXT.

Variables

Skip ahead to $0869 or whatever location you discovered in $2D. Press both SHIFT and the Commodore key to put the screen in upper/lowercase mode. Each non-array variable uses seven bytes: two for the variable name and five for the value.

Floating point variables such as X1, X2, and GG have both characters in lowercase (x1, x2, gg). Note that the values 1, 2, 4, and 8 are represented as $81, $82, $83, and $84. When you multiply by two, the mantissa remains the same but the binary exponent is increased by one.

The integer variable GG% has two uppercase characters (GG) in the name slot and only uses the first two bytes for the value. The two characters 00 and 09 after GG mean the value is nine. This is a rare exception to the low-byte/high-byte rule. In integer variables, the high byte comes first.

The string variable GG$ has one lowercase and one uppercase letter (gG). GG$ was set to equal the string *nine*. The three characters following the name are 04 4A 08. The first is the string length (*nine* has four characters). The second is the address of the string, $084A, with the low byte in front of the high byte. The final two bytes are meaningless.

simple answers to common questions

Tom R. Halfhill, Staff Editor

Each month, COMPUTE!'s Gazette tackles some questions commonly asked by Commodore users. If you have a question you'd like to see answered here, send it to this column, c/o COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403.

Q. Would it ever be possible for software and/or third-party manufacturers to undertake an MS-DOS emulator for the Commodore 128? Though I am no expert at this, it sounds reasonable to me that with the 512K memory expansion and the Z80 chip, it might be possible.

A. There's an adage which goes, "Any computer can emulate any other computer as long as speed is not a consideration." In other words, it *is* possible for a Commodore 128 to emulate an MS-DOS (IBM PC compatible) computer—or an Apple, or an Atari, or even a Cray-1 supercomputer—but it would run at a crawl. An eight-bit computer like the 128 simply lacks the horsepower to transparently emulate a more powerful machine like an IBM PC. Even the Amiga, which is more powerful than an IBM PC, cannot emulate the PC at full speed.

This assumes that the emulation is done entirely in software, however. Full-speed emulation is quite possible if additional hardware is brought into play. In this case, you'd need an 8088 or 8086 microprocessor, appropriate support chips, and read only memory (ROM) chips that simulate the IBM's BIOS (Basic Input/Output System). In effect, the emulator would be an MS-DOS computer without a keyboard or random access memory (RAM).

The drawback to this approach is that it's nearly as expensive as buying a complete MS-DOS computer, especially since low-end PC clones are available for around $600.

The Commodore 128's Z80 chip would be of little use. Although the Z80 probably has more in common with the IBM's 8088 than the 6502/6510-series chips, it's still very different from the 8088 and not powerful enough to emulate the IBM at full speed.

Q. I currently own a Commodore 64, a VIC-20, a 1541 disk drive, and a pair of Atari joysticks. I am thinking about purchasing a Commodore 128, and I'd like to know if the joysticks and the disk drive are compatible.

A. Your joysticks and disk drive are fully compatible with the Commodore 128. The 1571 disk drive which is sold for the 128 is desirable, but not required. Its main advantages are greater speed, increased storage capacity, and compatibility with CP/M disks when using the 128 in CP/M mode. (CP/M—which stands for Control Program/Microcomputers—is an old operating system for which a great deal of software has been written. Much of the software is oriented toward small-business applications.)

Q. One frequently sees, in copyrighted publications such as COMPUTE!'s Gazette, short programs and routines for enhancing screen displays, speeding up execution, or otherwise spicing up one's own programs. What are the ethical and legal ramifications of incorporating this code in our programs, especially if they might be sold or published?

A. The material which appears in COMPUTE!'s Gazette is intended for the use and enjoyment of our readers. Under U.S. copyright law, there is no problem with incorporating these routines into your own programs, because your purchase of the magazine grants you such use of the copyrighted material.

But if you want to sell or publish the resulting program, it's another story. According to the law, you must obtain written permission from the copyright holder to use copyrighted material. The holder may negotiate a fee for its use, or simply require that you include a copyright notice in your program. In any case, you must get permission in order to be on safe ground. If you're selling the program to our magazine, there's no problem, of course, since COMPUTE! Publications, Inc. holds the copyright.

Note that this law applies to copyrighted material of all kinds. For instance, if you wrote a computer program that used a copyrighted tune for musical background—say, "Yellow Submarine"—legally you'd have to obtain written permission from the copyright holder of that Beatles song before selling or publishing the program. Since this would likely involve the payment of royalties, you're better off sticking to tunes written by anonymous or long-deceased composers. On several occasions, our editorial programmers have been forced to rework submissions for this reason.

Also, note that the revamped U.S. copyright law expands the legal definition of what it means to "publish." Uploading a program to a bulletin board system (BBS) or allowing the members of your user group to make copies may well constitute publication should you run into copyright difficulties later.

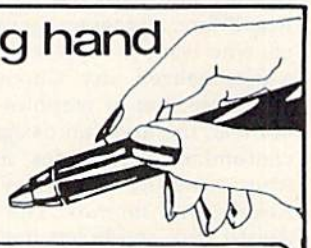
• "Menu System" (October 1986) will not load files from disk because its Load function uses the descriptive name of the files instead of the actual name. To correct that problem, change the P$ in line 130 to L$:

```
130 S6$="50 PRINT"+CHR$(34)
    +"{CLR}{3 DOWN}LOAD"+CH
    R$(34)+":Q$;L$(K);Q$;E$
    (K):IFS$(K)>"
```

• "Power BASIC: Sanitation Engineer" (February 1987) crashes if used in conjunction with a program having more than one string array. To correct the problem, type in and save a copy of the following short program. Now put the disk containing the original Sanitation Engineer program in the disk drive and type RUN. The patch program will load Sanitation Engineer, correct the problem, and save the corrected program back to your disk. In order to save Sanitation Engineer, the patch program must call the Kernal SAVE routine directly. Line 50 OPENs the program file SANITATION to store the corrected version and line 60 sets up the pointers for and calls the Kernal SAVE routine. (Lines 10, 30, and 50 of the patch program assume that your original copy of Sanitation Engineer is saved under the name SANITATION. If this is not the case, you must either change those lines in the patch program or rename the disk file to match the name used in the patch program.)

```
HF 10 IF A=0 THEN A=1:PRINT"LO
      ADING...":LOAD "SANITATI
      ON",8,1
CJ 20 FOR I=52020 TO 52027:REA
      DA:POKEI,A:NEXT
SH 30 OPEN15,8,15,"S0:SANITATI
      ON":INPUT#15,EN,EM$,ET,E
      S:CLOSE15:PRINTEN;EM$;ET
      ;ES
QR 40 PRINT "SAVE THE CORRECTE
      D VERSION..."
KG 50 OPEN1,8,1,"0:SANITATION,
      P,W"
KJ 60 POKE193,32:POKE194,202:P
      OKE780,193:POKE781,240:P
      OKE782,203:SYS65496
HP 70 CLOSE1
XA 80 DATA 228,50,144,4,197,49
      ,176,240
```

Draw yourself a winning hand



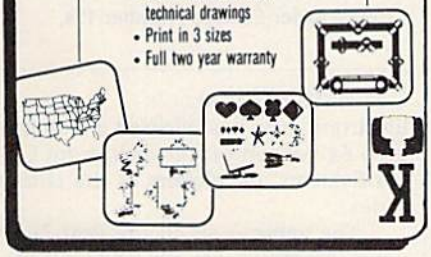
NOW $99.95 Limited Time

Flexidraw™

INTERACTIVE HI-RES GRAPHIC SYSTEM

Complete package includes Professional Quality Light Pen and Software

- Use to create Artistic/ technical drawings
- Print in 3 sizes
- Full two year warranty



A the NEW Graphics Integrator 2

THE GRAPHICS FORMAT CONVERSION PROGRAM THAT NOW SUPPORTS ALL OF YOUR FAVORITE GRAPHIC PACKAGES

Only $29.95

Including GEOS

- Flexidraw
- Doodle!
- Print Shop
- Print Master
- Newsroom
- Cadpak 64
- Computereyes
- Koala
- Billboard Maker
- Blazing Paddles
- Animation Station
- Super Sketch

Plus • Stand alone printer drivers • Slide Show

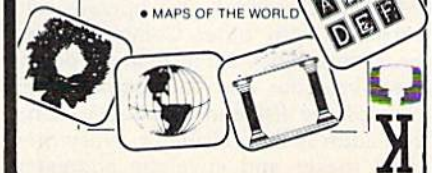
INTRODUCING the Graphics Galleria™

$24.95 ea.

A SERIES OF CLIP ART AND ILLUSTRATIONS FOR USE WITH Flexidraw AND DOODLE!

Now Available:

- HOLIDAY THEMES
- CLIP-ART POTPOURRI
- BORDERS & SIGNS
- MAPS OF THE WORLD



Inkwell Systems

CREATORS OF PENWARE

P.O. Box 85152 MB290
San Diego, CA 92138

619/268-8792

California residents add 6% sales tax
Add shipping of $4.00 (U.S.) $8.00 (Foreign)

news & products

Calendar Creator Kit

Epyx has introduced an easy-to-use program that lets you design your own daily, weekly, monthly, or yearly calendars. *Create a Calendar* offers an assortment of calendar types and decorative fonts, borders, and graphics suitable for special occasions. In addition, graphics from Epyx's *Graphics Scrapbook* or Brøderbund's *Print Shop* may also be used. Multiple lines of text and graphics can be placed on any day of the year; regularly scheduled events can be repeated automatically.

Suggested retail cost is expected to be $20-$30.

Epyx, 600 Galveston Dr., P.O. Box 8020, Redwood City, CA 94063

Circle Reader Service Number 170.

Award-Making Software

Hi Tech Expressions has expanded its product line with the introduction of *AwardWare*, a program for computer users who want to express recognition in a personalized way. Choosing from a large selection of graphics, fonts, and borders, the user can design and print customized certificates, awards, announcements, stationery, coupons, tickets, and memos. The Create An Award Disk option lets the user design an award and send it to a friend, who can load it and see it on the screen in a flashing marquee.

AwardWare retails for $14.95.

Hi Tech Expressions, 2699 S. Bayshore Dr., Suite 1000A, Coconut Grove, FL 33133

Circle Reader Service Number 171.

Desktop Accessory And Word Processing For Commodore 64

Timeworks recently introduced two new productivity programs for the Commodore 64.

Partner 64 is a cartridge-based system that offers eight memory-resident desktop accessories that operate concurrently with other Commodore 64 programs. They include an appointment calendar and date book, memo pad, phone list and autodialer, name and address list, calculator, typewriter, label maker and envelope addresser, and screen print function. Suggested retail price is $59.95.

Word Writer 3 is a word processing program for the Commodore 64 that includes an 85,000-word spelling checker, an integrated thesaurus, an outline processor, 80-column print preview mode, a highlighting feature, and automatic program setup. Documents from *Word Writer 3* can also be incorporated into the *GEOS* environment. The program retails for $49.95.

Timeworks, 444 Lake Cook Rd., Deerfield, IL 60015

Circle Reader Service Number 172.

Inexpensive Commodore 64 Software

Several software publishers have announced new lines, or additions to old lines, of inexpensive software for the Commodore 64. Though some of these are titles previously published by other software companies, many newly released programs are part of these offerings.

Mindscape: Mindscape introduced its Thunder Mountain line at CES, a grouping of programs previously published in the United States or Europe, for $9.95 each. Initial releases include *Rambo: First Blood, Part II; Voodoo Island; Maxi Golf;* and *Forbidden Castle.*

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062

Tri Micro: All programs in Tri Micro's French Vanilla line are priced at less than $10. They include *Printed Word*, a word processor available separately for $6.99 or in tandem with dictionary, file manager, or spreadsheet; educational programs like *BASIC Lessons, Advanced BASIC Lessons, Captains of Industry*, and *Words to Grow On/ Snowdrifts and Sunny Skies;* and entertainment products like *Rug Rider/Pancho, Saboteur/ Jet Set Willy II, White Viper/ Combat Lynx*, and *Touchdown/ Ten Pin.*

Tri Micro, 2116 S. Wright St., Santa Ana, CA 92705

BCI Software: New titles available from BCI include *Video-Phile*, a video library organizer for $19.99; *Montezuma's Revenge* and *Chess* for $9.99 each; and an expansion of its Printer's Library Series, graphics disks following various themes for $9.99 each.

BCI Software, 1140 Greenwood Lake Turnpike, P.O. Box 730, Ringwood, NJ 07456

Computer Easy International: CEI currently has 25 programs available in the areas of education, entertainment, and personal productivity. New for Commodore are *Crazy Conveyors, Pinball Math*, and *Touch Typing Tutor* at $9.95 each.

Computer Easy International, 414 E. Southern Rd., Tempe, AZ 85282

International Computer Disc: ICD offers a line of Commodore 64 games, each for less than $10. Commodore owners can choose from *S.A.G.A. Adventures #2,3,4* for $6.99 each; and *Gladiator, Split Personalities*, and *Mat II* for $9.99 each.

International Computer Disc, 50 Charles Lindbergh Blvd., Uniondale, NY 11553

Circle Reader Service Number 173.

Memory Cartridge

A new nonvolatile memory cartridge from Scinert Micro eliminates the tedium of manually loading often-used utility programs, function key settings, screen configurations, and so on, on power-up. Unlike EPROM cartridges, this cartridge makes changing contents easy: The loader program can set the user's program (BASIC or ML) to autoload, autoload and run on power-up, or be available by a SYS jump to the cartridge. A write-protect switch guards against accidental write access.

Scinert Micro Computer Products, P.O. Box 17546, Austin, TX 78760

Circle Reader Service Number 174.

Car Battle Game

Electronic Arts has released a Commodore 64 version of *Autoduel*, from Origin Systems, developers of the *Ultima* series.

The game is set in the year 2030, when highways are patrolled by marauding outlaws, and motorized arena combat is the most popular spectator sport of the day. In this futuristic setting, you must earn prestige and money in the dangerous arenas, highways, and cities. As you continue to survive, your abilities, fame, and fortune grow, which

allows you to purchase and custom-build your own vehicles, complete with weapons, armor, power plants, suspension, and body style. If you choose, and if you are an experienced autoduelist, you may specialize your talents as an arena fighter, a courier, or a vigilante, ridding the land of road outlaws and cycle gangs. As your skills continue to increase, you may achieve enough status to be enlisted by the FBI in order to find and destroy the ultimate evil force. *Autoduel* retails for $49.95.

Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94403

Circle Reader Service Number 175.

Attack Helicopter Simulation

MicroProse has announced *Gunship*, a realistic simulation of the Hughes AH-64A Apache combat helicopter, for the Commodore 64.

Gunship simulates the skill and action of high-speed, low-level helicopter flight. The game follows the career development of a helicopter pilot by tracking the player's record from early training through rank promotions and world missions and on to the possible award of a Congressional Medal of Honor.

All flying maneuvers are accurately represented in 3-D graphics. The high-tech information and weapons systems include lasers, video cameras, night viewers, radar warnings, jammers, onboard computers, missiles, rockets, flares, and a 30mm cannon. An 84-page operations manual and keyboard overlay are part of the package.

Gunship retails for $34.95.

MicroProse Software, 120 Lakefront Dr., Hunt Valley, MD 21030

Circle Reader Service Number 176.

New Arcade Action Games

Data East, publisher of popular action games like *Karate Champ* and *Kung Fu Master*, has released three new arcade hits for the Commodore 64. *Breakthru*, *Express Raider*, and *Ikari Warriors* are available for $19.95 each.

Data East USA, 470 Needles Dr., San Jose, CA 95112

Circle Reader Service Number 177.

Fantasy /Role-Playing Game

A new fantasy /role-playing game from Sierra, *Wrath of Denethenor*, is based on a Nordic legend about a prince who sells his soul to the devil, and is then killed by a thief out to get his ill-obtained wealth. The player takes on the roles of sorcerer, thief, and fighter as he travels around the lands surrounding Denethenor's domain.

Wrath of Denethenor retails for $19.95.

Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614

Circle Reader Service Number 178.

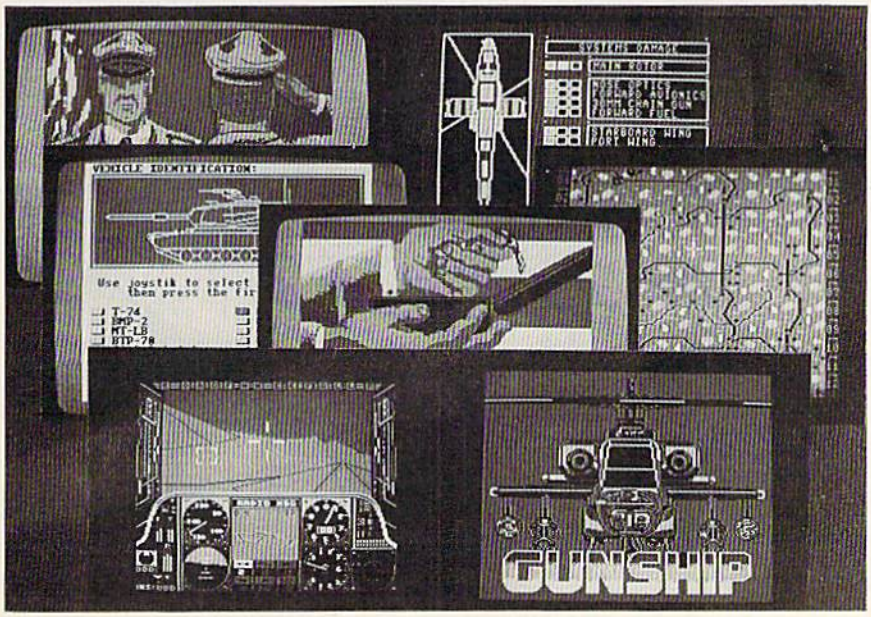
Thought Processor

Brøderbund has introduced *Thinking Cap*, an outline processor and thought organizer for the Commodore 64. By automatically formatting and organizing thoughts and ideas, *Thinking Cap* is designed to make writing an easier, more productive task. Its features include print formatting, outline templates, text editing, boldface and underline, and easy, automatic printer support.

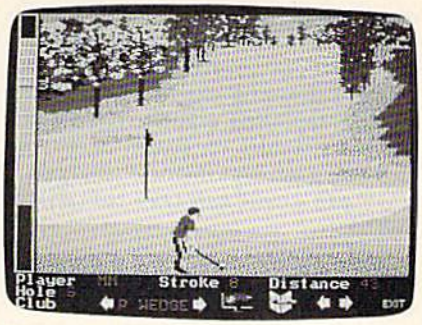
Thinking Cap retails for $49.95.

Brøderbund Software, 17 Paul Dr., San Rafael, CA 94903

Circle Reader Service Number 179.



Gunship *is another in the line of simulation titles from MicroProse.*



Famous Course Disk: Volume II *provides three new golf courses for use with Accolade's* Mean 18.

New Courses For *Mean 18*

As a result of the popularity of its golf simulation game *Mean 18*, Accolade has released *Famous Course Disk: Volume II*. In addition to the three famous courses contained on the *Mean 18* disk, this new disk contains simulations of Turnberry (Scotland), Inverness Club (Ohio), and Harbour Town (South Carolina). Users can incorporate the additional disk to expand their course selection, with program commands identical to those used in *Mean 18*. Suggested retail price is $19.95.

Accolade, 20833 Stevens Creek Blvd., Cupertino, CA 95014.

Circle Reader Service Number 180.

Arcade Action Games

Capcom has released a line of action games for the Commodore 64. *Gun-Smoke*, *Ghosts 'n' Goblins*, *1942*, and *Trojan* require physical dexterity and quick thinking skills. All Commodore 64 versions retail for $29.95 each.

Capcom, 1283-C Old Mountain View /Alviso Rd., Sunnyvale, CA 94089

Circle Reader Service Number 181.

Four Games In One

Indoor Sports from Mindscape gives you four action games in one package: bowling, darts, air hockey, and Ping-Pong. One- and two-player options, realistic 3-D graphics and animation, and high-score tracking are offered.

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062

Circle Reader Service Number 182.

128 Accounting System

Microsphere has released *Cash In—Cash Out* for the Commodore 128. The program is a cash basis accounting system designed specifically for a small-to-medium-sized business. The system records sales and expenses when checks are actually written for expenses or received for sales (cash basis method) rather than when sales are ordered

or expenses are incurred (accrual method). Modules are included for customizing business information, tracking sales, disbursing expenses, handling payroll, reporting regular reports, displaying graphics on screen or printer, and doing general financial analysis.

Cash In—Cash Out retails for $69.95.

Microsphere, Plymouth Center, 521 Plymouth St., Greensburg, PA 15601

Circle Reader Service Number 183.

Print Utility

Unison World recently introduced *PrintMaster Plus*, a printing utility that allows users to create customized signs, banners, stationery, calendars, and greeting cards. Each design option—Text, Graphics, and Layout—can be addressed repeatedly, in any order, before the final printout. You can also preview your work at each step.

With *PrintMaster Plus*, you can choose from over 100 different graphics; 280 additional graphics are available because of its compatibility with Unison World's *Art Gallery I* and *Art Gallery II*. The program also features a built-in graphics editor which allows the user to create or modify artwork. Ten type fonts are available.

The Commodore 64 version of *PrintMaster Plus* retails for $39.95.

Unison World, 2150 Shattuck Ave., Suite 902, Berkeley, CA 94704

Circle Reader Service Number 184.

Commodore 128 Integrated Software

Trio offers the Commodore 128 owner a word processor, spreadsheet, and database manager integrated on one disk. Also available for the Commodore 64, it retails for $69.95.

Softsync, 162 Madison Ave., New York, NY 10016

Circle Reader Service Number 185.

300/1200–Baud Modem

The TCM-1200H Hayes Compatible Modem has been introduced by Trans Com for use with the Commodore 64 and 128. The modem is an autoselect 300/1200–baud unit with originate and answer modes, eight LED status indicators, and eight DIP switches on the back panel.

Besides the full set of Hayes AT commands, the TCM-1200H is both Bell 212 and CCITT V.22 compatible. It requires no RS-232 interface to connect to the computer and is powered from the computer, eliminating the need for a power pack. Other features include a speaker with level control, two phone jacks, computer connecting cable, and tone or pulse dialing. Software is included for both the 64 and 128, along with a starter kit for the QuantumLink telecommunications service.

The modem carries a two-year warranty, and is priced at $179.95.

Trans Com, 703-13 Annoreno Dr., Addison, IL 60101.

Circle Reader Service Number 186.

64 Expanders And Connectors

Aprotek, known for its low-cost printers, has released three new products for the Commodore 64.

Aprospand-64 is a four-slot expander that allows the user to install up to four cartridges and use them either independently or in any combination allowed by the function of each cartridge. It also has a push-button reset switch that lets you make a restart without turning the computer off and back on again. The power line between computer and cartridges is fused to protect the computer from faulty cartridges. Suggested retail price is $33.

Extender-64 is a ribbon cable device that lets the user extend the location of a cartridge expander like the Aprospand-64 or compatible, allowing repositioning of cartridges. Price is $23.

USR-232 is a universal RS-232 interface for use with all Commodore computers equipped with a user port. Self-powered, it plugs into the user port, allowing additional devices to be plugged in. All RS-232–compatible devices and software can be used with the USR-232. Suggested list price is $43.

Aprotek, 1071-A Avenida Acaso, Camarillo, CA 93010

Circle Reader Service Number 187.

MIDI Products For 64

Sonus announced a full line of MIDI hardware and software at CES for a variety of computers, including the Commodore 64. The *Super Sequencer* ($275.95) is a professional MIDI recording system and librarian that includes a built-in system-exclusive librarian where you can store sound patches and functions. Other features included are set beginning and end of sequences; delete pitch and mod wheel; sustain pedal; volume change; and transposition of sequence or track. *Glass Tracks* ($69.95) is a smaller version of the sequencer. *ScoreWriter* ($199.95) offers manuscript printout, editing, and sequencing. A MIDI interface is also available for $75.

Sonus, 21430 Strathern St., Suite H, Canoga Park, CA 91304

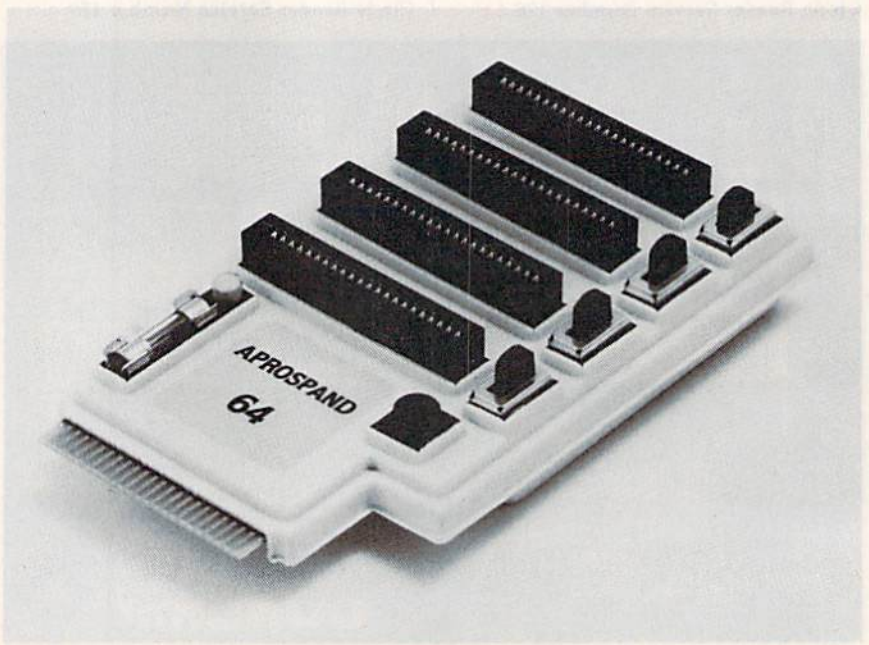
Circle Reader Service Number 188.

World War II Strategy

War in the South Pacific is among the new strategy entertainment programs released by Strategic Simulations (SSI) for the Commodore 64.

The game includes three scenarios from which to choose: the Battle of the Coral Sea (May 1942), the Invasion of Guadalcanal (August 1942), and the Japanese attempt to counterattack on Guadalcanal (October 1942). Each scenario plays to March 1943. More than 400 ships, 17 types of aircraft, and numerous infantry units can be engaged in one-, four-, or eight-hour modes of play.

Each hourly turn allows for every ship, plane, and infantry company to be accounted for, including damage re-



Aprospand 64 is a four-slot cartridge expander for the Commodore 64.

ports. The game is designed for two players, or can be played against the computer. Suggested retail price is $59.95.

SSI, 1046 N. Rengstorff Ave., Mountain View, CA 94043

Circle Reader Service Number 189.

Multifunction Plug-In Cartridge Expands Commodore's Capabilities

The Final Cartridge from H & P Computers is a completely external operating system created specifically for the Commodore 64. Though it does not reside in RAM or use any working memory, it is always standing by to assist, improve, and speed up the functioning of hardware and software.

The Final Cartridge is plugged into the back of the keyboard housing. It provides five-times-faster loading and saving; ten-times-faster tape access; preprogramming for function keys that eliminates long, tedious command sequences; an extended machine language monitor with relocated load-scrolling up and down, bankswitching, and so on; and a Centronics printer interface. The BASIC tool kit features such functions as automatic line-numbering, one-touch deletion of large program blocks, and recovery of accidentally deleted programs.

The menu-driven Freezer feature offers 16 submenus, four resets, print vector setting, color changes, Centronics/serial screen dumps, reverse printing, and automatic backup to disk or tape. The Gamekiller kills sprite-to-sprite or sprite-to-background collision. And the Screendump feature prints full-page, lo-res, hi-res, and multicolor graphics from games and paint programs like *Doodle* and *KoalaPad*, and searches automatically from the memory address of the picture.

The Final Cartridge provides many keyboard extras, and creates 24K of additional RAM. Suggested retail price is $44.95.

Home & Personal Computers Of America, 154 Valley St., South Orange, NJ 07079

Circle Reader Service Number 190.

Abacus Telecommunications And Portfolio Management

Abacus Software has released two new software packages for the Commodore 64 and 128. *SpeedTerm*, originally designed for the 128, includes both the 64 and 128 versions in one package. This command-driven terminal communications program lets you communicate with other computer users via online services such as CompuServ, GEnie, Delphi, The Source, and others.

SpeedTerm offers a large capture buffer—the 64 version has 24K and the 128 version has 45K. Also, *SpeedTerm* supports both XMODEM and Punter file-transfer protocols. The software supports partial VT52 terminal emulation and works with most popular modems. This program features a command mode with over 30 commands and user-defined function keys. The 128 version can be used with either a 40- or an 80-column monitor and a 1541 or 1571 disk drive. The complete package includes a 70-page manual with tutorials.

The new Commodore 128 version of *Personal Portfolio Manager* contains many of the features of the original 64 version plus additional functions. It can be used by the home or professional user to manage a portfolio, obtain up-to-the-minute quotes and news, and perform analyses.

Other uses include recording taxable or nontaxable dividends and interest income, reconciling brokerage accounts, tailoring reports, and entering quotes manually or automatically through Warner Computer Systems and Dow Jones. The software includes an autorun and timing feature so the system will log on, update quotes, log off, and print reports. Over 1000 open transactions can be retained on a single disk.

Personal Portfolio Manager for the Commodore 128 can be used with either a 40- or an 80-column monitor and a 1541 or 1571 disk drive.

SpeedTerm retails for $39.95; *Personal Portfolio Manager*, $59.95.

Abacus Software, P.O. Box 7219, Grand Rapids, MI 49510

Circle Reader Service Number 191.

Electronic Network For Commodore

A new service for Commodore 64 owners has been introduced that combines the features of an electronic bulletin board system (BBS) with a disk-based electronic magazine.

Spectrum Electronic Network is an offline BBS and magazine on a disk, featuring 16 different special interest groups (SIGs) devoted to a variety of topics. They include a technical help line, providing useful BASIC programming tips and shortcuts in a question-and-answer format; an electronic pen-pal forum, which enables subscribers to contact and exchange private mail with other users across the U.S.; a freeware trading post; a writer's roundtable; and New Age Horizons, which explores psychic and metaphysical topics.

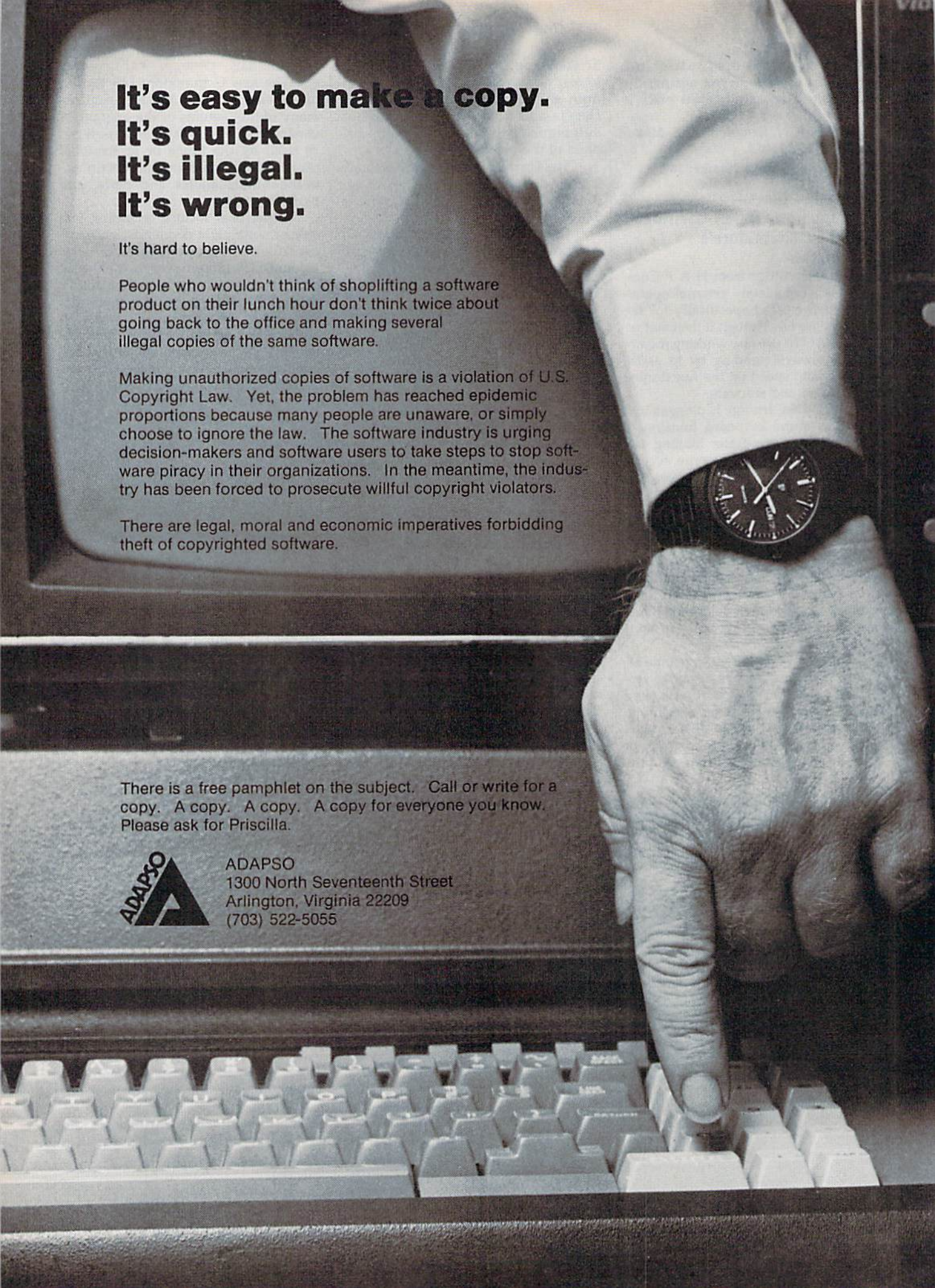
This service differs from conventional online BBSs and subscriber networks in that there are no long distance charges, busy signals, time limits, or access fees. Rather, subscribers receive a monthly disk with continuously updated features, public messages, and private mail.

New subscribers pay a one-time fee of $14.95 for the operating system software and support utilities; a two-month subscription is included in the package at no extra cost. Thereafter, a flat monthly subscription fee of $6 is charged.

Spectrum 1 Network, P.O. Box 4903, Panorama City, CA 91412-4903

Circle Reader Service Number 192.

The Final Cartridge, from H & P Computers Of America, is an external operating System for the Commodore 64.


It's easy to make a copy.
It's quick.
It's illegal.
It's wrong.
It's hard to believe.
People who wouldn't think of shoplifting a software product on their lunch hour don't think twice about going back to the office and making several illegal copies of the same software.
Making unauthorized copies of software is a violation of U.S. Copyright Law. Yet, the problem has reached epidemic proportions because many people are unaware, or simply choose to ignore the law. The software industry is urging decision-makers and software users to take steps to stop software piracy in their organizations. In the meantime, the industry has been forced to prosecute willful copyright violators.
There are legal, moral and economic imperatives forbidding theft of copyrighted software.
There is a free pamphlet on the subject. Call or write for a copy. A copy. A copy. A copy for everyone you know. Please ask for Priscilla.
ADAPSO
ADAPSO
1300 North Seventeenth Street
Arlington, Virginia 22209
(703) 522-5055

How To Type In *COMPUTE!'s GAZETTE* Programs

Each month, COMPUTE!'s GAZETTE publishes programs for the Commodore 128, 64, Plus/4, 16, and VIC-20. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We frequently publish two programs designed to make typing easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off then back on, erasing whatever was in memory. So be sure to *save a copy of your program before you run it.* If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from the GAZETTE, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor down key; {5 SPACES} means to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the character is underlined. For example, A means hold down the SHIFT key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight SHIFTed A's).

If a key is enclosed in special brackets, [ ], hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the CTRL key while typing the letter in braces. For example, {A} means to press CTRL-A.

The Quote Mode

Although you can move the cursor around the screen with the CRSR keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT} and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is *the quote mode.*

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a reverse video character (a graphics symbol for cursor left). In this case, you can use the DELete key to back up and edit the line. Type another quote and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing RETURN. Then just cursor up to the mistyped line and fix it.

When You Read:	Press:	See:
{CLR}	SHIFT + CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT + ↑ CRSR ↓	
{DOWN}	↑ CRSR ↓	
{LEFT}	SHIFT + ←CRSR→	
{RIGHT}	←CRSR→	
{RVS}	CTRL + 9	
{OFF}	CTRL + 0	
{BLK}	CTRL + 1	
{WHT}	CTRL + 2	
{RED}	CTRL + 3	
{CYN}	CTRL + 4	

When You Read:	Press:	See:
{PUR}	CTRL + 5	
{GRN}	CTRL + 6	
{BLU}	CTRL + 7	
{YEL}	CTRL + 8	
{ F1 }	f1	
{ F2 }	SHIFT + f1	
{ F3 }	f3	
{ F4 }	SHIFT + f3	
{ F5 }	f5	
{ F6 }	SHIFT + f5	
{ F7 }	f7	
{ F8 }	SHIFT + f7	

When You Read:	Press:	See:
←	←	
↑	SHIFT + ↑	

For Commodore 64 Only

[1]	COMMODORE + 1	
[2]	COMMODORE + 2	
[3]	COMMODORE + 3	
[4]	COMMODORE + 4	
[5]	COMMODORE + 5	
[6]	COMMODORE + 6	
[7]	COMMODORE + 7	
[8]	COMMODORE + 8	

The Automatic Proofreader

Philip I. Nelson, Assistant Editor

"The Automatic Proofreader" helps you type in program listings for the 128, 64, Plus/4, 16, and VIC-20 and prevents nearly every kind of typing mistake.

Type in the Proofreader *exactly* as listed. Since the program can't check itself, type carefully to avoid mistakes. Don't omit any lines, even if they contain unfamiliar commands. After finishing, save a copy or two on disk or tape before running it. This is important because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Next, type RUN and press RETURN. After announcing which computer it's running on, the Proofreader displays the message "Proofreader Active". Now you're ready to type in a BASIC program.

Every time you finish typing a line and press RETURN, the Proofreader displays a two-letter checksum in the upper-left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, it's almost certain the line was typed correctly. If the letters don't match, check for your mistake and correct the line.

The Proofreader ignores spaces not enclosed in quotes, so you can omit or add spaces between keywords and still see a matching checksum. However, since spaces inside quotes are almost always significant, the Proofreader pays attention to them. For example, **10 PRINT"THIS IS BASIC"** will generate a different checksum than **10 PRINT"THIS ISBA SIC"**.

A common typing error is transposition—typing two successive characters in the wrong order, like PIRNT instead of PRINT or 64378 instead of 64738. The Proofreader is sensitive to the *position* of each character within the line and thus catches transposition errors.

The Proofreader does *not* accept keyword abbreviations (for example, ? instead of PRINT). If you prefer to use abbreviations, you can still check the line by LISTing it after typing it in, moving the cursor back to the line, and pressing RETURN. LISTing the line substitutes the full keyword for the abbreviation and allows the Proofreader to work properly. The same technique works for rechecking programs you've already typed in.

If you're using the Proofreader on the Commodore 128, Plus/4, or 16, *do not perform any GRAPHIC commands while the Proofreader is active.* When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the Proofreader—to another memory area, causing the Proofreader to crash. The same thing happens if you *run* any program with a GRAPHIC command while the Proofreader is in memory.

Though the Proofreader doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. However, the Proofreader is purposely difficult to dislodge: It's not affected by tape or disk operations, or by pressing RUN/STOP– RESTORE. The simplest way to disable it is to turn the computer off then on. A gentler method is to SYS to the computer's built-in reset routine (SYS 65341 for the 128, 64738 for the 64, 65526 for the Plus/4 and 16, and 64802 for the VIC). These reset routines erase any program in memory, so be sure to save the program you're typing in before entering the SYS command.

If you own a Commodore 64, you may already have wondered whether the Proofreader works with other programming utilities like "MetaBASIC." The answer is generally yes, *if you're using a 64 and activate the Proofreader after installing the other utility.* For example, first load and activate MetaBASIC, then load and run the Proofreader.

When using the Proofreader with another utility, you should disable *both* programs before running a BASIC program. While the Proofreader seems unaffected by most utilities, there's no way to promise that it will work with any and every combination of utilities you might want to use. The more utilities activated, the more fragile the system becomes.

The New Automatic Proofreader

```
10 VEC=PEEK(772)+256*PEEK(773)
   :LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADE
   R FOR ";:IF VEC=42364 THEN
   {SPACE}PRINT "C-64"
30 IF VEC=50556 THEN PRINT "VI
   C-20"
40 IF VEC=35158 THEN GRAPHIC C
   LR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=
   46:GRAPHIC CLR:PRINT"128"
60 SA=(PEEK(LO)+256*PEEK(HI))+
   6:ADR=SA
70 FOR J=0 TO 166:READ BYT:POK
   E ADR,BYT:ADR=ADR+1:CHK=CHK
   +BYT:NEXT
80 IF CHK<>20570 THEN PRINT "*
   ERROR* CHECK TYPING IN DATA
    STATEMENTS":END
90 FOR J=1 TO 5:READ RF,LF,HF:
   RS=SA+RF:HB=INT(RS/256):LB=
   RS-(256*HB)
100 CHK=CHK+RF+LF+HF:POKE SA+L
   F,LB:POKE SA+HF,HB:NEXT
110 IF CHK<>22054 THEN PRINT "
   *ERROR* RELOAD PROGRAM AND
   {SPACE}CHECK FINAL LINE":EN
   D
120 POKE SA+149,PEEK(772):POKE
    SA+150,PEEK(773)
130 IF VEC=17165 THEN POKE SA+
   14,22:POKE SA+18,23:POKESA+
   29,224:POKESA+139,224
140 PRINT CHR$(147);CHR$(17);"
   PROOFREADER ACTIVE":SYS SA
150 POKE HI,PEEK(HI)+1:POKE (P
   EEK(LO)+256*PEEK(HI))-1,0:N
   EW
160 DATA 120,169,73,141,4,3,16
   9,3,141,5,3
170 DATA 88,96,165,20,133,167,
   165,21,133,168,169
180 DATA 0,141,0,255,162,31,18
   1,199,157,227,3
190 DATA 202,16,248,169,19,32,
   210,255,169,18,32
200 DATA 210,255,160,0,132,180
   ,132,176,136,230,180
210 DATA 200,185,0,2,240,46,20
   1,34,208,8,72
220 DATA 165,176,73,255,133,17
   6,104,72,201,32,208
230 DATA 7,165,176,208,3,104,2
   08,226,104,166,180
240 DATA 24,165,167,121,0,2,13
   3,167,165,168,105
250 DATA 0,133,168,202,208,239
   ,240,202,165,167,69
260 DATA 168,72,41,15,168,185,
   211,3,32,210,255
270 DATA 104,74,74,74,74,168,1
   85,211,3,32,210
280 DATA 255,162,31,189,227,3,
   149,199,202,16,248
290 DATA 169,146,32,210,255,76
   ,86,137,65,66,67
300 DATA 68,69,70,71,72,74,75,
   77,80,81,82,83,88
310 DATA 13,2,7,167,31,32,151,
   116,117,151,128,129,167,136
   ,137
```

MLX Machine Language Entry Program For Commodore 64 and 128

Ottis R. Cowper, Technical Editor

"MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs. Included are versions for the Commodore 64 and 128.

Type in and save some copies of whichever version of MLX is appropriate for your computer (you'll want to use it to enter future ML programs from COMPUTE!'s GAZETTE). Program 1 is for the Commodore 64, and Program 2 is for the 128 (128 MLX can also be used to enter Commodore 64 ML programs for use in 64 mode). When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0–9 and the letters A–F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using MLX.

After you enter the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

A functions menu will appear. The first option in the menu is ENTER DATA. If you're just starting to type in a program, pick this. Press the E key, and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you left off typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing RETURN alone when asked for the address. (You can get back to the menu from most options by pressing RETURN with no other input.)

Entering A Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing. (Commodore 128 users *can* enter the data from an MLX listing using the built-in monitor if the rightmost column of data is omitted, but we recommend against it. It's much easier to let MLX do the proofreading and error checking for you.)

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

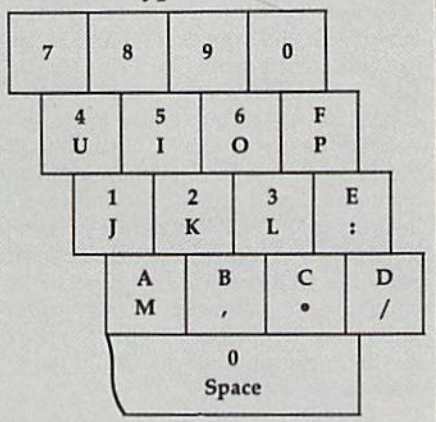
Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

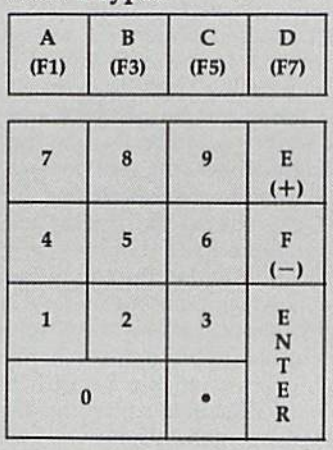
Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, 128 MLX redefines the function keys and + and − keys on the numeric keypad so that you can enter data one-handed. (The 64 version incorporates the keypad modification from the March 1986 "Bug-Swatter" column, lines 485–487.) In either case, the keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figures above show the keypad configurations for each version.

MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take reasonable care while entering data.

64 MLX Keypad



128 MLX Keypad



Editing Features

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over. The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you type a character of data, MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line

number prompt.

More editing features are available when correcting lines in which MLX has detected an error. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. The cursor left and right keys provide the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

Display Data

The second menu choice, DISPLAY DATA, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press space again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press RETURN.

Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are SAVE FILE and LOAD FILE; their operation is quite straightforward. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save (save only for the 128 version). Don't panic; this is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands (128 MLX makes use of BLOAD). Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750 in 64 MLX), so this should *not* be included when entering the name. This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name. The 128 version makes up for this by giving you the option of scratching the existing file if you want to reuse a filename.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. (Tape users should bear in mind that Commodore computers are never able to detect errors during a save to tape.) MLX also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT *address*, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct starting and ending addresses.

The 128 version also has a CATALOG DISK option so you can view the contents of the disk directory before saving or loading.

The QUIT menu option has the obvious effect—it stops MLX and enters BASIC. The RUN/STOP key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, RUN/STOP–RESTORE also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD *"filename"*,8 for disk (DLOAD *"filename"* on the 128) or LOAD *"filename"* for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64 or 1C01 for the 128. Other programs must be reloaded to specific addresses with a command such as LOAD *"filename"*,8,1 for disk (BLOAD *"filename"* on the 128) or LOAD *"filename"*,1,1 for tape, then started with a SYS to a particular memory address. On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address C000. In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

An Ounce Of Prevention

By the time you finish typing in the data for a long ML program, you may have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to ensure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

Program 1: MLX For Commodore 64

```
SS 10 REM VERSION 1.1: LINES 8
      30,950 MODIFIED, LINES 4
      85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
       I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
       4=254:Z5=255:Z6=256:Z7=
       127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
       :BS=PEEK(55)+Z6*PEEK(56
       ):H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
       :S$=" ":D$=CHR$(20):Z$=
       CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
       +23:POKE I,0:NEXT:POKE
       {SPACE}SD+24,15:POKE 78
       8,52
FC 150 PRINT"{CLR}"CHR$(142)CH
       R$(8):POKE 53280,15:POK
       E 53281,15
EJ 160 PRINT T$" {RED}{RVS}
       {2 SPACES}§8 @§
       {2 SPACES}"SPC(28)"
       {2 SPACES}{OFF}{BLU} ML
       X II {RED}{RVS}
       {2 SPACES}"SPC(28)"
       {12 SPACES}{BLU}"
FR 170 PRINT"{3 DOWN}
       {3 SPACES}COMPUTE!'S MA
       CHINE LANGUAGE EDITOR
       {3 DOWN}"
JB 180 PRINT"{BLK}STARTING ADD
```

```
      RESS[4]";:GOSUB300:SA=AD:GOSUB1040:IF F THEN180
GF 190 PRINT"{BLK}{2 SPACES}ENDING ADDRESS[4]";:GOSUB300:EA=AD:GOSUB1030:IF {SPACE}F THEN190
KR 200 INPUT"{3 DOWN}{BLK}CLEAR WORKSPACE [Y/N][4]";A$:IF LEFT$(A$,1)<>"Y"THEN220
PG 210 PRINT"{2 DOWN}{BLU}WORKING...";:FORI=BS TO BS+EA-SA+7:POKE I,0:NEXT:PRINT"DONE"
DR 220 PRINTTAB(10)"{2 DOWN}{BLK}{RVS} MLX COMMAND {SPACE}MENU {DOWN}[4]":PRINT T$"{RVS}E{OFF}NTER DATA"
BD 230 PRINT T$"{RVS}D{OFF}ISPLAY DATA":PRINT T$"{RVS}L{OFF}OAD FILE"
JS 240 PRINT T$"{RVS}S{OFF}AVE FILE":PRINT T$"{RVS}Q{OFF}UIT{2 DOWN}{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=MID$("EDLSQ",I,1)THEN A=I:I=5
FD 270 NEXT:ON A GOTO420,610,690,700,280:GOSUB1060:GOTO250
EJ 280 PRINT"{RVS} QUIT ":INPUT"{DOWN}[4]ARE YOU SURE [Y/N]";A$:IF LEFT$(A$,1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$=MID$(IN$,3):GOSUB320:AD=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID$(B$,J,1):B=ASC(A$)-C4+(A$>"@")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(H$,B+1,1);:B=A-B*C6:PRINT MID$(H$,B+1,1);:RETURN
RR 360 A=INT(AD/Z6):GOSUB350:A=AD-A*Z6:GOSUB350:PRINT":";
BE 370 CK=INT(AD/Z6):CK=AD-Z4*CK+Z5*(CK>Z7):GOTO390
PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"{DOWN}STARTING AT [4]";:GOSUB300:IF IN$<>N$ THEN GOSUB1030:IF F {SPACE}THEN400
EX 410 RETURN
HD 420 PRINT"{RVS} ENTER DATA {SPACE}":GOSUB400:IF IN$=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F THEN PRINT IN$:PRINT"{UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$=S$:FOR J=1 TO 2:IF F THEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"{RVS}"B$L$;:IF I<24THEN PRINT"{OFF}";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF(A$>"/"ANDA$<":")OR(A$>"@"ANDA$<"G")THEN540
GS 485 A=-(A$="M")-2*(A$=",")-3*(A$=".")-4*(A$="/")-5*(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$=":")-9*(A$="U")-10*(A$="I")-11*(A$="O")-12*(A$="P")
CM 487 A=A-13*(A$=S$):IF A THEN A$=MID$("ABCD123E456F0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J=1)OR F)THEN PRINT B$;:J=2:NEXT:I=24:GOTO550
KC 500 IF A$="{HOME}" THEN PRINT B$:J=2:NEXT:I=24:NEXT:F=0:GOTO440
MX 510 IF(A$="{RIGHT}")ANDF THENPRINT B$L$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR((I=0)AND(J=1))THEN GOSUB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$L$;:J=2-J:IF J THEN PRINT {SPACE}L$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT {SPACE}S$;
PM 550 NEXT I:PRINT:PRINT"{UP}{5 RIGHT}";:INPUT#3,IN$:IF IN$=N$ THEN CLOSE3:GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=MID$(IN$,I):GOSUB320:IF I<25 THEN GOSUB380:A(I/3)=A
PK 570 NEXT:IF A<>CK THEN GOSUB1060:PRINT"{BLK}{RVS}{SPACE}ERROR: REENTER LINE [4]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FOR I=0 TO 7:POKE B+I,A(I):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN CLOSE3:PRINT"{DOWN}{BLU}** END OF ENTRY **{BLK}{2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"{CLR}{DOWN}{RVS}{SPACE}DISPLAY DATA ":GOSUB400:IF IN$=N$ THEN220
RJ 620 PRINT"{DOWN}{BLU}PRESS: {RVS}SPACE{OFF} TO PAUSE, {RVS}RETURN{OFF} TO BREAK[4]{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR I=BTO B+7:A=PEEK(I):GOSUB350:GOSUB380:PRINT S$;
CC 640 NEXT:PRINT"{RVS}";:A=CK:GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA THENPRINT"{DOWN}{BLU}** END OF DATA **":GOTO220
KC 660 GET A$:IF A$=R$ THEN GOSUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOSUB1080
AD 680 ONFGOTO630,660,630
CM 690 PRINT"{DOWN}{RVS} LOAD {SPACE}DATA ":OP=1:GOTO710
PC 700 PRINT"{DOWN}{RVS} SAVE {SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT"{DOWN}FILENAME[4]";IN$:IF IN$=N$ {SPACE}THEN220
PR 720 F=0:PRINT"{DOWN}{BLK}{RVS}T{OFF}APE OR {RVS}D{OFF}ISK: [4]";
FP 730 GET A$:IF A$="T"THEN PRINT"T{DOWN}":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT"D{DOWN}":OPEN15,8,15,"I0:":B=EA-SA:IN$="0:"+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+",P,W":GOSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(AH*256):PRINT#1,CHR$(AL);CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CHR$(PEEK(BS+I));:IF ST THEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOTO940
GS 800 GOSUB1060:PRINT"{DOWN}{BLK}ERROR DURING SAVE:[4]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+",P,R":GOSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z$)+256*ASC(B$+Z$):IF AD<>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:POKE BS+I,ASC(A$+Z$):IF(I<>B)AND ST THEN F=2:AD=I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F>0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN CLOSE1:CLOSE15:GOSUB1060:PRINT"{RVS}ERROR: "A$
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE187,PEEK(FA+3):POKE188,PEEK(FA+4):IFOP=0THEN920
HJ 890 SYS 63466:IF(PEEK(783)AND1)THEN GOSUB1060:PRINT"{DOWN}{RVS} FILE NOT {SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(830):IF AD<>SA THEN F=1:GOTO970
SC 910 A=PEEK(831)+256*PEEK(832)-1:F=F-2*(A<EA)-3*(A>EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:POKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOSUB1010:ON OP GOTO950:SYS 63591
AE 940 GOSUB1080:PRINT"{BLU}** SAVE COMPLETED **":GOTO220
XP 950 POKE147,0:SYS 63562:IF {SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT"{BLU}** LOAD COMPLETED **":GOTO220
DP 970 GOSUB1060:PRINT"{BLK}{RVS}ERROR DURING LOAD:{DOWN}[4]":ON F GOSUB980,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTING ADDRESS (";:GOSUB360:PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT ";:AD=SA+AD:GOSUB360:PRINT D$:RETURN
FD 1000 PRINT"TRUNCATED AT ENDING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH*256):POKE193,AL:POKE194,AH
FF 1020 AH=INT(B/256):AL=B-(AH*256):POKE174,AL:POKE175,AH:RETURN
FX 1030 IF AD<SA OR AD>EA THEN1050
HA 1040 IF(AD>511 AND AD<40960
```

```
        )OR(AD>49151 AND AD<53
        248)THEN GOSUB1080:F=0
        :RETURN
HC 1050 GOSUB1060:PRINT"{RVS}
        {SPACE}INVALID ADDRESS
         {DOWN}{BLK}":F=1:RETU
        RN
AR 1060 POKE SD+5,31:POKE SD+6
        ,208:POKE SD,240:POKE
        {SPACE}SD+1,4:POKE SD+
        4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
        TO1090
PF 1080 POKE SD+5,8:POKE SD+6,
        240:POKE SD,0:POKE SD+
        1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
        KE SD+4,0:POKE SD,0:PO
        KE SD+1,0:RETURN
```

Program 2: MLX For Commodore 128

```
AE 100 TRAP 960:POKE 4627,128:
       DIM NL$,A(7)
XP 110 Z2=2:Z4=254:Z5=255:Z6=2
       56:Z7=127:BS=256*PEEK(4
       627):EA=65280
FB 120 BE$=CHR$(7):RT$=CHR$(13
       ):DL$=CHR$(20):SP$=CHR$
       (32):LF$=CHR$(157)
KE 130 DEF FNHB(A)=INT(A/256):
       DEF FNLB(A)=A-FNHB(A)*2
       56:DEF FNAD(A)=PEEK(A)+
       256*PEEK(A+1)
JB 140 KEY 1,"A":KEY 3,"B":KEY
        5,"C":KEY 7,"D":VOL 15
       :IF RGR(0)=5 THEN FAST
FJ 150 PRINT"{CLR}"CHR$(142);C
       HR$(8):COLOR 0,15:COLOR
        4,15:COLOR 6,15
GQ 160 PRINT TAB(12)"{RED}
       {RVS}{2 SPACES}[9 @]
       {2 SPACES}"RT$;TAB(12)"
       {RVS}{2 SPACES}{OFF}
       {BLU} 128 MLX {RED}
       {RVS}{2 SPACES}"RT$;TAB
       (12)"{RVS}{13 SPACES}
       {BLU}"
FE 170 PRINT"{2 DOWN}
       {3 SPACES}COMPUTE!'S MA
       CHINE LANGUAGE EDITOR
       {2 DOWN}"
DK 180 PRINT"{BLK}STARTING ADD
       RESS[4]";:GOSUB 260:IF
       {SPACE}AD THEN SA=AD:EL
       SE 180
FH 190 PRINT"{BLK}{2 SPACES}EN
       DING ADDRESS[4]";:GOSUB
        260:IF AD THEN EA=AD:E
       LSE 190
MF 200 PRINT"{DOWN}{BLK}CLEAR
       {SPACE}WORKSPACE [Y/N]?
       [4]":GETKEY A$:IF A$<>"
       Y" THEN 220
QH 210 PRINT"{DOWN}{BLU}WORKIN
       G...";:BANK 0:FOR A=BS
       {SPACE}TO BS+(EA-SA)+7:
       POKE A,0:NEXT A:PRINT"D
       ONE"
DC 220 PRINT TAB(10)"{DOWN}
       {BLK}{RVS} MLX COMMAND
       {SPACE}MENU [4]{DOWN}":
       PRINT TAB(13)"{RVS}E
       {OFF}NTER DATA"RT$;TAB(
       13)"{RVS}D{OFF}ISPLAY D
       ATA"RT$;TAB(13)"{RVS}L
       {OFF}OAD FILE"
HB 230 PRINT TAB(13)"{RVS}S
       {OFF}AVE FILE"RT$;TAB(1
       3)"{RVS}C{OFF}ATALOG DI
       SK"RT$;TAB(13)"{RVS}Q
       {OFF}UIT{DOWN}{BLK}"
AP 240 GETKEY A$:A=INSTR("EDLS
       CQ",A$):ON A GOTO 340,5
       50,640,650,930,940:GOSU
       B 950:GOTO 240
SX 250 PRINT"STARTING AT";:GOS
       UB 260:IF(AD<>0)OR(A$=N
       L$)THEN RETURN:ELSE 250
BG 260 A$=NL$:INPUT A$:IF LEN(
       A$)=4 THEN AD=DEC(A$)
PP 270 IF AD=0 THEN BEGIN:IF A
       $<>NL$ THEN 300:ELSE RE
       TURN:BEND
MA 280 IF AD<SA OR AD>EA THEN
       {SPACE}300
PM 290 IF AD>511 AND AD<65280
       {SPACE}THEN PRINT BE$;:
       RETURN
SQ 300 GOSUB 950:PRINT"{RVS} I
       NVALID ADDRESS {DOWN}
       {BLK}":AD=0:RETURN
RD 310 CK=FNHB(AD):CK=AD-Z4*CK
       +Z5*(CK>Z7):GOTO 330
DD 320 CK=CK*Z2+Z5*(CK>Z7)+A
AH 330 CK=CK+Z5*(CK>Z5):RETURN
QD 340 PRINT BE$;"{RVS} ENTER
       {SPACE}DATA ":GOSUB 250
       :IF A$=NL$ THEN 220
JA 350 BANK 0:PRINT:F=0:OPEN 3
       ,3
BR 360 GOSUB 310:PRINT HEX$(AD
       )+":";:IF F THEN PRINT
       {SPACE}L$:PRINT"{UP}
       {5 RIGHT}";
QA 370 FOR I=0 TO 24 STEP 3:B$
       =SP$:FOR J=1 TO 2:IF F
       {SPACE}THEN B$=MID$(L$,
       I+J,1)
PS 380 PRINT"{RVS}"B$+LF$;:IF
       {SPACE}I<24 THEN PRINT"
       {OFF}";
RC 390 GETKEY A$:IF (A$>"/" AN
       D A$<":") OR(A$>"@" AND
        A$<"G") THEN 470
AC 400 IF A$="+" THEN A$="E":G
       OTO 470
QB 410 IF A$="-" THEN A$="F":G
       OTO 470
FB 420 IF A$=RT$ AND ((I=0) AN
       D (J=1) OR F) THEN PRIN
       T B$;:J=2:NEXT:I=24:GOT
       O 480
RD 430 IF A$="{HOME}" THEN PRI
       NT B$:J=2:NEXT:I=24:NEX
       T:F=0:GOTO 360
XB 440 IF (A$="{RIGHT}") AND F
        THEN PRINT B$+LF$;:GOT
       O 470
JP 450 IF A$<>LF$ AND A$<>DL$
       {SPACE}OR ((I=0) AND (J
       =1)) THEN GOSUB 950:GOT
       O 390
PS 460 A$=LF$+SP$+LF$:PRINT B$
       +LF$;:J=2-J:IF J THEN P
       RINT LF$;:I=I-3
GB 470 PRINT A$;:NEXT J:PRINT
       {SPACE}SP$;
HA 480 NEXT I:PRINT:PRINT"{UP}
       {5 RIGHT}";:L$="
       {27 SPACES}"
DP 490 FOR I=1 TO 25 STEP 3:GE
       T#3,A$,B$:IF A$=SP$ THE
       N I=25:NEXT:CLOSE 3:GOT
       O 220
BA 500 A$=A$+B$:A=DEC(A$):MID$
       (L$,I,2)=A$:IF I<25 THE
       N GOSUB 320:A(I/3)=A:GE
       T#3,A$
AR 510 NEXT I:IF A<>CK THEN GO
       SUB 950:PRINT:PRINT"
       {RVS} ERROR: REENTER LI
       NE ":F=1:GOTO 360
DX 520 PRINT BE$:B=BS+AD-SA:FO
       R I=0 TO 7:POKE B+I,A(I
       ):NEXT I
XB 530 F=0:AD=AD+8:IF AD<=EA T
       HEN 360
CA 540 CLOSE 3:PRINT"{DOWN}
       {BLU}** END OF ENTRY **
       {BLK}{2 DOWN}":GOTO 650
MC 550 PRINT BE$;"{CLR}{DOWN}
       {RVS} DISPLAY DATA ":GO
       SUB 250:IF A$=NL$ THEN
       {SPACE}220
JF 560 BANK 0:PRINT"{DOWN}
       {BLU}PRESS: {RVS}SPACE
       {OFF} TO PAUSE, {RVS}RE
       TURN{OFF} TO BREAK[4]
       {DOWN}"
XA 570 PRINT HEX$(AD)+":";:GOS
       UB 310:B=BS+AD-SA
DJ 580 FOR I=B TO B+7:A=PEEK(I
       ):PRINT RIGHT$(HEX$(A),
       2);SP$;:GOSUB 320:NEXT
       {SPACE}I
XB 590 PRINT"{RVS}";RIGHT$(HEX
       $(CK),2)
GR 600 F=1:AD=AD+8:IF AD>EA TH
       EN PRINT"{BLU}** END OF
        DATA **":GOTO 220
EB 610 GET A$:IF A$=RT$ THEN P
       RINT BE$:GOTO 220
QK 620 IF A$=SP$ THEN F=F+1:PR
       INT BE$;
XS 630 ON F GOTO 570,610,570
RF 640 PRINT BE$"{DOWN}{RVS} L
       OAD DATA ":OP=1:GOTO 66
       0
BP 650 PRINT BE$"{DOWN}{RVS} S
       AVE FILE ":OP=0
DM 660 F=0:F$=NL$:INPUT"FILENA
       ME[4]";F$:IF F$=NL$ THE
       N 220
RF 670 PRINT"{DOWN}{BLK}{RVS}T
       {OFF}APE OR {RVS}D{OFF}
       ISK: [4]";
SQ 680 GETKEY A$:IF A$="T" THE
       N 850:ELSE IF A$<>"D" T
       HEN 680
SP 690 PRINT"DISK{DOWN}":IF OP
        THEN 760
EG 700 DOPEN#1,(F$+",P"),W:IF
       {SPACE}DS THEN A$=DS$:G
       OTO 740
JH 710 BANK 0:POKE BS-2,FNLB(S
       A):POKE BS-1,FNHB(SA):P
       RINT"SAVING ";F$:PRINT
MC 720 FOR A=BS-2 TO BS+EA-SA:
       PRINT#1,CHR$(PEEK(A));:
       IF ST THEN A$="DISK WRI
       TE ERROR":GOTO 750
GC 730 NEXT A:CLOSE 1:PRINT"
       {BLU}** SAVE COMPLETED
       {SPACE}WITHOUT ERRORS *
       *":GOTO 220
RA 740 IF DS=63 THEN BEGIN:CLO
       SE 1:INPUT"{BLK}REPLACE
        EXISTING FILE [Y/N][4]
       ";A$:IF A$="Y" THEN SCR
       ATCH(F$):PRINT:GOTO 700
       :ELSE PRINT"{BLK}":GOTO
        660:BEND
GA 750 CLOSE 1:GOSUB 950:PRINT
       "{BLK}{RVS} ERROR DURIN
       G SAVE: [4]":PRINT A$:G
       OTO 220
FD 760 DOPEN#1,(F$+",P"):IF DS
        THEN A$=DS$:F=4:CLOSE
       {SPACE}1:GOTO 790
```

```
PX 770 GET#1,A$,B$:CLOSE 1:AD=
       ASC(A$)+256*ASC(B$):IF
       {SPACE}AD<>SA THEN F=1:
       GOTO 790
KB 780 PRINT"LOADING ";F$:PRIN
       T:BLOAD(F$),B0,P(BS):AD
       =SA+FNAD(174)-BS-1:F=-2
       *(AD<EA)-3*(AD>EA)
RQ 790 IF F THEN 800:ELSE PRIN
       T"{BLU}** LOAD COMPLETE
       D WITHOUT ERRORS **":GO
       TO 220
ER 800 GOSUB 950:PRINT"{BLK}
       {RVS} ERROR DURING LOAD
       : {4}":ON F GOSUB 810,8
       20,830,840:GOTO220
QJ 810 PRINT"INCORRECT STARTIN
       G ADDRESS (";HEX$(AD);"
       )":RETURN
DP 820 PRINT"LOAD ENDED AT ";H
       EX$(AD):RETURN
EB 830 PRINT"TRUNCATED AT ENDI
       NG ADDRESS ("HEX$(EA)")
       ":RETURN
FP 840 PRINT"DISK ERROR ";A$:R
       ETURN
KS 850 PRINT"TAPE":AD=POINTER(
       F$):BANK 1:A=PEEK(AD):A
       L=PEEK(AD+1):AH=PEEK(AD
       +2)
XX 860 BANK 15:SYS DEC("FF68")
       ,0,1:SYS DEC("FFBA"),1,
       1,0:SYS DEC("FFBD"),A,A
       L,AH:SYS DEC("FF90"),12
       8:IF OP THEN 890
FG 870 PRINT:A=SA:B=EA+1:GOSUB
        920:SYS DEC("E919"),3:
       PRINT"SAVING ";F$
AB 880 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("EA18"):
       PRINT"{DOWN}{BLU}** TAP
       E SAVE COMPLETED **":GO
       TO 220
CP 890 SYS DEC("E99A"):PRINT:I
       F PEEK(2816)=5 THEN GOS
       UB 950:PRINT"{DOWN}
       {BLK}{RVS} FILE NOT FOU
       ND ":GOTO 220
GQ 900 PRINT"LOADING ...{DOWN}
       ":AD=FNAD(2817):IF AD<>
       SA THEN F=1:GOTO 800:EL
       SE AD=FNAD(2819)-1:F=-2
       *(AD<EA)-3*(AD>EA)
JD 910 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("E9FB"):
       IF ST>0 THEN 800:ELSE 7
       90
XB 920 POKE193,FNLB(A):POKE194
       ,FNHB(A):POKE 174,FNLB(
       B):POKE 175,FNHB(B):RET
       URN
CP 930 CATALOG:PRINT"{DOWN}
       {BLU}** PRESS ANY KEY F
       OR MENU **":GETKEY A$:G
       OTO 220
MM 940 PRINT BE$"{RVS} QUIT
       {4}";RT$;"ARE YOU SURE
       {SPACE}[Y/N]?":GETKEY A
       $:IF A$<>"Y" THEN 220:E
       LSE PRINT"{CLR}":BANK 1
       5:END
JE 950 SOUND 1,500,10:RETURN
AF 960 IF ER=14 AND EL=260 THE
       N RESUME 300
MK 970 IF ER=14 AND EL=500 THE
       N RESUME NEXT
KJ 980 IF ER=4 AND EL=780 THEN
        F=4:A$=DS$:RESUME 800
DQ 990 IF ER=30 THEN RESUME:EL
       SE PRINT ERR$(ER);" ERR
       OR IN LINE";EL
```


DISCOUNT SOFTWARE and *FREE* Leroy's Cheatsheet

We carry a complete line of software at competitive prices. **PLUS** - on any software package of **$25.00** or more you get a ***FREE*** **Leroy's Cheatsheet** of your choice! See below for shipping information.

COMMODORE 64

ABACUS
- Basic Compiler 64 — $ 30
- Cad Pac 64 — $ 30
- Chart Pak 64 — $ 30
- Cobol 64 — $ 30

ACCESS
- Leader Board Golf — $ 28
- Tournament Disk 1 — $ 17
- Exec Tournament 1 — $ 17
- Triple Pack — $ 19

ARTWORKS
- Strip Poker — $ 24
- Data Disks each — $ 19

BERKELY SOFTWORKS
- GEOS — $ 42
- Deskpack 1 — $ 25
- Fontpack 1 — $ 22
- GeoChart — $ 28
- GeoCalc — $ 36
- GeoFile — $ 36
- GeoDex — $ 28
- GeoPublish — $ 36
- Writer's Workshop — $ 36

BOOKS ON GEOS

Abacus
- Geos inside & out — $ 19

Midnight Press
- How to get the most out of GEOS — $ 14
- Disk for book — $ 9

BATTERIES INCLUDED
- Consultant — $ 42
- Paperclip/Spell Pak — $ 52

BRODERBUND
- Carman Sandiego — $ 26
- Print Shop — $ 29
- Print Shop Comp — $ 26
- Grphc Libraries *ea.* — $ 19

CSM
- 1541 Alignment Kit — $ 34

DIGITAL SOLUTIONS
- Pocket Filer — $ 30
- Pocket Planner — $ 30
- Pocket Writer — $ 30

ELECTRONIC ARTS
- Marble Madness — $ 26
- Make your own murder party — $ 26

EPYX
- Fast Load (cart) — $ 26
- Multiplan — $ 42
- World Games — $ 26

FIREBIRD
- Elite — $ 22
- Pawn — $ 32

INFOCOM
- Lthr Goddesses — $ 28

MICROPROSE
- Gunship — $ 26
- F-15 Strike Eagle — $ 26
- Silent Service — $ 26

PRECISION
- Superbase 64 — $ 51
- Superscript 64 — $ 51

PROFESSIONAL
- Fleet System 2 — $ 38
- Fleet Filer — $ 30

SIMON & SCHUSTER
- Chem. Lab — $ 28
- Paper Airplane Kit — $ 22

SPRINGBOARD
- Newsroom — $ 37
- Clip Art Vol 1 — $ 22
- Certificate Maker — $ 37
- Certificate Library v.1 — $ 26

SUBLOGIC
- Football — $ 32
- Flight Simulator II — $ 35
- Jet — $ 31
- Scenery disks *(each)* — $ 16

TIMEWORKS
- Data Manager 2 — $ 37
- SwiftCalc w/Sideways — $ 37
- SwiftTax - 1986 — $ 37
- Sylvia Porter Fin Plnr — $ 36
- Word Writer w/Speller — $ 37

Don't forget to select your ***FREE*** **Leroy's Cheatsheet** when ordering a program of $25 or more.

COMMODORE 128

ABACUS
- Basic 7.0 Compiler — $ 45
- Cad Pac 128 — $ 45
- Chart Pak 128 — $ 30
- Super C — $ 45
- Super Pascal 128 — $ 45

BATTERIES INCLUDED
- Consultant — $ 46
- Paperclip II — $ 54

DIGITAL SOLUTIONS
- Pocket Filer — $ 37
- Pocket Planner — $ 37
- Pocket Writer — $ 37

EPYX
- Multiplan 128 — $ 45

PRECISION
- Superbase 128 — $ 66
- Superscript128 — $ 54

PROFESSIONAL
- Fleet System 4 — $ 51
- Fleet Filer — $ 30

TIMEWORKS
- Data Manager 128 — $ 50
- Partner 128 — $ 46
- Swiftcalc 128 — $ 50
- Word Writer 128 — $ 50

LEROY'S CHEATSHEET®

Keyboard Overlays

$7.95 each

PLASTIC LAMINATED

For your **COMMODORE 128**

$3.95 each

For your **COMMODORE 64**

Put Your Computer's Commands Where They Belong - And Your Manuals On The Shelf.

Have you ever sat at your computer with the manual in your lap trying to find an elusive command? How much time have you lost searching through manuals to refresh your memory on how to do what you wanted? Now you have a way to end that frustration - **Leroy's Cheatsheets**.

Leroy's Cheatsheets help you get into your program right away. We put the commands right at your fingertips, actual keystrokes are in **bold** type, variables are shown in *italics*. Designed by software experts, our durable plastic laminated overlays are comprehensive reference aids which document a product or system completely. Now use your software more easily and more effectively. With Leroy's Cheatsheets you'll never have to hunt for a program command again!!!

See below for ordering information.

only ***$7.95*** each

Plus Shipping

LEROY'S HELPBOOK FOR ELITE

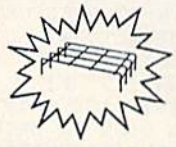
By David Palmer - The first person in the U.S to attain ELITE status. Filled with hints & tips to sharpen your combat and traiding skills. Covers approaching space station, goods to trade on what planets, quickest way to become ELITE and prepares you for FIREBIRD'S ELITE TOURNAMENT.

The Problem Solver

EQUIPMENT STAND

By Leroy

only ***$ 19.95***



Made of **sturdy vinyl coated steel** - strong enough for any computer equipment. This equipment stand will help you **organize your system**. With this unique open construction, cables are never in the wrong place, switches are more accessable and your equipment **stays cooler**. The Problem Solver Equipment stand was **specially designed** for Commodore computers 128 & 64. Keeps your monitor at eye level (Great for **printers** too).

See below for ordering information.

Order Now and Save ... Money, Time and Frustration

COMMODORE 128 *$7.95 ea*

Please send me the following **LEROY'S CHEATSHEETS** for the COMMODORE 128 for only $7.95 each plus shipping.

DIE - CUT

- ☐ Basic 7.0
- ☐ Blanks (NOT laminated)
- ☐ Data Manager 128
- ☐ Disk 1571
- ☐ Easy Script
- ☐ Elite
- ☐ Fleet System 2 & 3
- ☐ Flight Simulator 2
- ☐ For The Beginner
- NEW ☐ GEOS
- NEW ☐ Multiplan 128
- NEW ☐ Newsroom
- NEW ☐ Paperback Filer
- NEW ☐ Paperback Planner
- ☐ Paperback Writer
- ☐ Paperclip //
- ☐ Superbase 128
- ☐ Superscript 128
- NEW ☐ SwiftCalc 128
- ☐ Word Writer 128

FREE **- Keyboard extender** (each order)

COMMODORE 64 *$3.95 ea*

Please send me the following **LEROY'S CHEATSHEETS** for the COMMODORE 64 for only $3.95 each plus shipping.

CUT-OUT-YOURSELF ON DOTTED LINES

- ☐ Basic 2.0
- ☐ Blanks (NOT laminated)
- ☐ Data Manager
- NEW ☐ Data Manager 2
- ☐ Disk 1541
- ☐ Easyscript
- ☐ Elite
- ☐ FleetSystem 2
- ☐ Flight Simulator 2
- ☐ For The Beginner
- ☐ GEOS
- ☐ Multiplan
- ☐ Newsroom
- ☐ Paperback Filer
- ☐ Paperback Planner
- ☐ Paperback Writer
- ☐ PaperClip
- ☐ Speedscript
- ☐ Superbase 64
- ☐ Superscript 64
- NEW ☐ SwiftCalc
- ☐ Word Writer

Also fits the COMMODORE 64C

☐ ___ **Equipment stand(s)** for only ***$19.95*** each

☐ ___ **ELITE HELPBOOK** for only **$7.95** each

☐ Program name(s)_____

Name _____

Address _____

City _____ State ___ Zip ____

ORDERING INFORMATION: For fast delivery send cashier's check or money order. Personal & company checks allow 2 weeks to clear. Master Card and Visa orders please include card #, expiration date .Prices and availability subject to change without notice.

SHIPPING:

TOTAL ORDER	Cont. U.S.	APO FPO,AK HI,CAN,PR	INTER-NATIONAL
UP to $10	$2.00	$2.00	$5.00
$10 - $25	$3.00	$4.00	$7.00
$25 - $50	$4.00	$5.00	$9.00
$50 UP	$5.00	$6.00	$15.00

TAXES: Add 6% sales (include shipping) for PA residents only

GAZ4

HOURS: 8 AM - 5 PM EST Monday thru Friday U.S. FUNDS ONLY NO C.O.D.

CHEATSHEET PRODUCTS, INC. P.O. Box 111368 Pittsburgh, PA. 15238

For Orders only **TOLL *FREE*** 1-800-334-2896 PA Orders - (412) 781-1551 **DEALER INQUIRES WELCOME**

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Print Shop To *GEOS*

Article on page 66.

```
SD 10 AD=22528:POKE53281,0:POK
      E53280,0:PRINT"{CLR}
      {25 DOWN}"
FK 20 PRINT"{5 SPACES}{YEL}
      {RVS}{A}CCCCCCCCCCCCCCCC
      CCCCCCCCCCCCC{S}"
PM 30 PRINT"{5 SPACES}{RVS}BPR
      INT SHOP TO GEOS CONVERT
      ERB"
DJ 40 PRINT"{5 SPACES}{RVS}{Z}
      CCCCCCCCCCCCCCCCCCCCCCCC
      CCCC{X}"
SE 50 FORN=1TO11:PRINT:NEXT:GO
      TO190
SD 60 FF=0:PRINT#15,"U1:2 0"+S
      TR$(T)+STR$(S)
SS 70 GET#2,A$:TN=ASC(A$+CHR$(
      0)):GET#2,A$:SN=ASC(A$+C
      HR$(0))
DC 80 FORN=0TO7:PRINT#15,"B-P:
      2,"+STR$(32*N+2)
RQ 90 GET#2,A$:IFA$<>CHR$(131)
      THEN160
RP 100 GET#2,A$:TP=ASC(A$+CHR$
      (0)):GET#2,A$:SP=ASC(A$
      +CHR$(0)):H$=""
GB 110 GET#2,A$:IFA$<>CHR$(160
      )THENH$=H$+A$:GOTO110
SD 120 IFH$<>DI$THEN160
FR 130 FF=1:KP=N:N=7
MQ 140 PRINT#15,"B-P:2,"+STR$(
      32*KP+30)
ER 150 GET#2,A$:SL=ASC(A$+CHR$
      (0)):GET#2,A$:SH=ASC(A$
      +CHR$(0))
DX 160 NEXT:IFTN=0THENRETURN
SC 170 IFFF=1THENRETURN
CB 180 T=TN:S=SN:GOTO60
EQ 190 PRINT"{WHT}{9 UP}
      {2 SPACES}PLACE PRINT S
      HOP DATA DISK IN DRIVE"
SD 200 PRINT"{DOWN}{7 SPACES}P
      RESS {RVS}RETURN{OFF} W
      HEN READY..."
KP 210 GETA$:IFA$<>CHR$(13)THE
      NGOSUB970:GOTO210
ME 220 POKE53280,0
XR 230 PRINT"{CLR}{3 DOWN}
      {2 SPACES}ARE THESE GRA
      PHICS FOR A {RVS}C{OFF}
      OMMODORE"
DC 240 PRINT"{DOWN}{11 SPACES}
      OR {RVS}O{OFF}THER PRIN
      TER?";
BP 250 GETA$:IFA$="C"THENSF=2:
      W=6:H=45:GOTO280
EB 260 IFA$="O"THENSF=3:W=11:H
      =52:GOTO280
RF 270 GOTO250
SC 280 NL=INT(H/8+1)*8:PRINT"
      {CLR}"
QC 290 PRINT"{DOWN}TYPE FILE N
      AME OR PRESS {RVS}RETUR
      N{OFF} FOR LIST":INPUTN
      $
RH 300 IFN$=""THENGOSUB680
SD 310 OPEN15,8,15:OPEN8,8,0,N
      $:INPUT#15,EN,EB$,ET,ES
CK 320 IFEN<>0THENCLOSE8:CLOSE
      15:PRINT"{CLR}{DOWN}";S
      PC(20-LEN(EB$)/2)EB$:N$
      ="":GOTO290
FX 330 PRINT"{CLR}{12 DOWN}"SP
      C(16-LEN(N$)/2)"LOADING
       "+N$
JM 340 POKE185,0:POKE780,0:POK
      E781,0:POKE782,88:SYS65
      493:CLOSE8:CLOSE15
GS 350 PRINT"{CLR}{DOWN}
      {8 SPACES}PLACE GEOS DI
      SK IN DRIVE"
DR 360 PRINT"{DOWN}{7 SPACES}P
      RESS {RVS}RETURN{OFF} W
      HEN READY..."
KQ 370 GETA$:IFA$<>CHR$(13)THE
      NGOSUB970:GOTO370
BF 380 POKE53280,0:PRINT"
      {DOWN}{9 SPACES}SAVING
      {SPACE}PHOTOSCRAP FILE"
MR 390 OPEN15,8,15,"I0":INPUT#
      15,EN,EB$,ET,ES:IFEN<>0
      THEN1000
DQ 400 OPEN2,8,2,"S,U,W":INPUT
      #15,EN,EB$,ET,ES:IFEN<>
      0THEN1000
HP 410 PRINT#2,CHR$(W)CHR$(NL)
      CHR$(0)CHR$(2*W)CHR$(0)
      ;
MX 420 FORN=0TOH-1:PRINT#2,CHR
      $(128+W);:FORM=0TOW-1
RC 430 PRINT#2,CHR$(PEEK(AD+W*
      N+M));:NEXT:NEXT
FQ 440 PRINT#2,CHR$((NL-H-2)*W
      )CHR$(0)CHR$(W*NL/8)CHR
      $(191)CHR$(0);:CLOSE2
FE 450 DATA80,104,111,116,111,
      32,83,99,114,97,112
HB 460 P$="":FORN=0TO10:READX:
      P$=P$+CHR$(X):NEXT
MG 470 OPEN2,8,2,"#":T=18:S=1:
      DI$=P$:GOSUB60
MH 480 IFFF=0THENPRINT"{DOWN}
      {RVS}NO PHOTO SCRAP FIL
      E":GOTO640
RJ 490 T1=T:S1=S:FS=256*SH+SL-
      1:T2=TP:S2=SP:K1=KP
KK 500 T=18:S=1:DI$="S":GOSUB6
      0
MM 510 PRINT#15,"B-P:2,"+STR$(
      32*KP+3)
BS 520 PRINT#2,CHR$(T2)CHR$(S2
      );
DE 530 PRINT#15,"B-P:2,"+STR$(
      32*KP+30)
HE 540 FH=INT(FS/256):FL=FS-25
      6*FH
AM 550 PRINT#2,CHR$(FL)CHR$(FH
      );
HF 560 PRINT#15,"U2:2 0"+STR$(
      T)+STR$(S)
CR 570 PRINT#15,"U1:2 0"+STR$(
      T1)+STR$(S1)
DQ 580 PRINT#15,"B-P:2,"+STR$(
      32*K1+3)
XF 590 PRINT#2,CHR$(TP)CHR$(SP
      );
QQ 600 PRINT#15,"B-P:2,"+STR$(
      32*K1+30)
XD 610 PRINT#2,CHR$(SF+1)CHR$(
      0);
MB 620 PRINT#15,"U2:2 0"+STR$(
      T1)+STR$(S1)
CC 630 PRINT#15,"S0:S"
PA 640 CLOSE2:CLOSE15
GC 650 PRINT"{CLR}{10 DOWN}
      {18 RIGHT}DONE"
HF 660 PRINT"{DOWN}{4 SPACES}P
      LACE {RVS}GEOS{OFF} MAS
      TER DISK IN DRIVE"
PJ 670 PRINT"{DOWN}{7 SPACES}H
      IT {RVS}RESTORE{OFF} TO
       REBOOT GEOS":END
AG 680 OPEN15,8,15,"I0":OPEN2,
      8,2,"#":X=0:M=0:T=18:S=
      1:N=0
JB 690 PRINT"{CLR}{2 SPACES}TH
      E GRAPHIC FILES ON THIS
       DISK ARE:"
PR 700 PRINT#15,"U1:2 0"+STR$(
      T)+STR$(S)
RH 710 GET#2,A$:TN=ASC(A$+CHR$
      (0)):GET#2,A$:SN=ASC(A$
      +CHR$(0))
BQ 720 PRINT#15,"B-P:2,"+STR$(
      N*32+2)
XE 730 GET#2,A$:FT=ASC(A$+CHR$
      (0)):IF(191ANDFT)<>130T
      HENN=N+1:GOTO810
KQ 740 PRINT#15,"B-P:2,"+STR$(
      N*32+30)
SQ 750 GET#2,A$:FS=ASC(A$+CHR$
      (0)):GET#2,A$:FS=FS+256
      *ASC(A$+CHR$(0))
CJ 760 IFFS<>SFTHENN=N+1:GOTO8
      10
QQ 770 PRINT#15,"B-P:2,"+STR$(
      N*32+5):D$=""
QA 780 GET#2,A$:IFA$<>CHR$(160
      )THEND$=D$+A$:GOTO780
DS 790 X=X+1:M=M+1:IFM=16THENM
      =0:GOTO840
EC 800 PRINT"{3 SPACES}"+CHR$(
      34)+D$+CHR$(34):N=N+1
JS 810 IFN<8THEN720
FB 820 N=0:T=TN:S=SN:IFT<>0THE
      N700
BD 830 IFT=0THEN860
KK 840 PRINT"{8 SPACES}PRESS
      {RVS}RETURN{OFF} TO SEE
       MORE"
XR 850 PRINT"{DOWN}{4 SPACES}T
      YPE ← AND PRESS {RVS}RE
      TURN{OFF} TO ABORT"
FK 860 IFX=0THENPRINT"{DOWN}
      {8 SPACES}NONE{DOWN}":G
      OTO930
CF 870 PRINT"{DOWN}{6 SPACES}P
      LACE CURSOR NEXT TO NAM
      E OR"
XA 880 PRINT"{3 SPACES}TYPE NA
      ME AND PRESS {RVS}RETUR
      N{OFF} TO LOAD":INPUTN$
AP 890 IFN$="←"THENN$="":GOTO9
      20
BH 900 IFN$<>""THENCLOSE2:CLOS
      E15:RETURN
BH 910 IFT<>0THEN690
JF 920 PRINT"{CLR}";
GC 930 CLOSE2:CLOSE15:PRINT"
      {DOWN}{4 SPACES}PLACE A
      NOTHER DATA DISK IN DRI
      VE"
MC 940 PRINT"{DOWN}{7 SPACES}P
      RESS {RVS}RETURN{OFF} W
      HEN READY..."
QX 950 GETA$:IFA$<>CHR$(13)THE
      NGOSUB970:GOTO950
MF 960 POKE53280,0:GOTO680
JG 970 A=A+1:IFA>10THENPOKE532
      80,2
PA 980 IFA>20THENPOKE53280,0:A
      =0
CE 990 RETURN
HR 1000 PRINT"{CLR}";SPC(20-LE
      N(EB$)/2)"{DOWN}{RED}"
      +EB$
GQ 1010 PRINT"{DOWN}{GRN}
      {11 SPACES}RESETTING D
      RIVE...{WHT}"
```

```
CH 1020 PRINT#15,"UJ":FORN=1TO
        1500:NEXT:CLOSE15:CLOS
        E2:GOTO380
```

TurboSave 64

See instructions in article on page 71 before typing in.

```
0801:0B 08 00 00 9E 32 30 36 EC
0809:31 00 00 00 A0 1B B9 0E A4
0811:0D 99 C5 02 88 D0 F7 A2 01
0819:A1 84 FD 86 FE A0 3B A2 D6
0821:08 84 FB 86 FC A2 05 A0 5B
0829:00 B1 FB 91 FD C8 D0 F9 EC
0831:E6 FC E6 FE CA D0 F2 4C 8C
0839:C6 02 EE D8 07 20 AB 07 AF
0841:EE D8 07 20 AB 07 EE D8 12
0849:07 A0 E8 20 AD 07 84 6D 24
0851:A9 03 8D D8 07 AD 00 1C 41
0859:09 0C 8D 00 1C A9 EE 8D 95
0861:0C 1C A9 07 85 6E A9 12 6F
0869:85 18 A9 00 85 87 85 88 55
0871:20 07 06 20 C7 05 A6 80 36
0879:A4 81 8E EB 07 8C EC 07 18
0881:20 AB 07 A6 80 A4 81 86 F7
0889:18 84 19 AD 00 03 08 F0 D1
0891:0D 20 6F 04 A6 80 A4 81 60
0899:8E 00 03 8C 01 03 20 EF 5E
08A1:04 E6 88 28 D0 DA 4C AB 37
08A9:06 A9 03 85 6F 20 B8 05 52
08B1:D0 2A A5 80 C9 12 F0 12 FB
08B9:90 14 E6 80 A5 80 C9 24 E2
08C1:D0 EB A9 11 85 80 C6 6F A6
08C9:D0 E3 A9 72 D0 48 C6 80 4D
08D1:D0 DB A9 13 85 80 C6 6F D2
08D9:D0 D3 F0 EE 84 6F A5 81 03
08E1:18 69 0A 85 81 A5 80 20 B5
08E9:4B F2 8D 4E 02 C9 15 D0 25
08F1:02 E6 81 C5 81 B0 0C 38 68
08F9:A5 81 ED 4E 02 85 81 F0 F9
0901:02 C6 81 20 0D F2 F0 03 11
0909:4C 98 EF A9 00 85 81 20 39
0911:0D F2 D0 F4 A9 71 20 C7 EA
0919:E6 20 2C C1 A9 01 85 1C C0
0921:85 1D 4C DA EB EA EA EA 40
0929:EA 20 6A 05 A9 03 85 31 EB
0931:20 E9 F5 85 3A 20 8F F7 4E
0939:20 3D 05 A2 09 50 FE B8 B5
0941:CA D0 FA A9 CE 8D 0C 1C C7
0949:A9 FF 8D 03 1C A2 05 8D 15
0951:01 1C B8 50 FE B8 CA D0 48
0959:FA A0 BB B9 00 01 50 FE C7
0961:B8 8D 01 1C C8 D0 F4 B1 3A
0969:30 50 FE B8 8D 01 1C C8 84
0971:D0 F5 50 FE 4C 00 FE A9 6D
0979:00 45 16 45 17 45 18 45 37
0981:19 85 1A 20 34 F9 A2 5A EF
0989:20 EF 05 50 FE B8 AD 01 84
0991:1C D9 24 00 D0 06 C8 C0 9D
0999:08 D0 F0 60 CA D0 E9 A9 1F
09A1:27 4C DC 04 A5 18 38 E5 1A
09A9:22 F0 30 B0 07 49 FF 69 E0
09B1:01 A0 CA 2C A0 E8 8C 84 CE
09B9:05 0A A8 AE 00 1C E8 8A 9D
09C1:29 03 85 4B AD 00 1C 29 5D
09C9:FC 05 4B 8D 00 1C A9 94 36
09D1:8D 05 18 2C 05 18 30 FB 96
09D9:88 D0 E0 A5 18 85 22 20 16
09E1:4B F2 AD 00 1C 29 9F 1D ED
09E9:B4 05 8D 00 1C 60 00 20 CB
09F1:40 60 A5 80 AA A0 00 C8 99
09F9:C8 C8 C8 CA D0 F9 B1 6D A7
0A01:60 A9 12 85 D0 85 D1 E6 71
0A09:D0 A5 D0 85 80 20 B8 05 5C
0A11:D0 0D C6 D1 A5 D1 85 80 C6
0A19:F0 0C 20 B8 05 F0 E8 A9 9F
0A21:F6 85 81 4C 6F 04 4C DA 06
0A29:04 A9 D0 8D 05 18 A9 28 A0
0A31:2C 05 18 10 71 2C 00 1C F8
0A39:30 F6 AD 01 1C B8 A0 00 ED
0A41:60 A2 01 86 19 20 6F 06 E4
0A49:A0 00 98 48 A8 B9 02 03 78
0A51:D0 0C A5 87 D0 12 84 86 5C
0A59:A5 19 85 87 D0 0A A2 00 A3
0A61:BD ED 07 D9 05 03 F0 36 9A
0A69:68 18 69 20 D0 DD AE 01 43
0A71:03 AD 00 03 D0 CD A4 87 31
0A79:D0 C6 A4 19 84 81 86 86 8B
0A81:A9 02 8D A8 04 A0 48 20 7A
0A89:A2 04 A9 0A 8D A8 04 A2 7F
0A91:12 A4 81 84 87 8C 01 03 C3
0A99:8E 00 03 4C EF 04 C8 E8 24
0AA1:E0 10 90 BC A9 63 4C DC 58
0AA9:04 A9 03 85 31 20 6A 05 C6
0AB1:20 3D 05 20 EF 05 50 FE FA
0AB9:B8 AD 01 1C 91 30 C8 D0 27
0AC1:F5 A0 BA 50 FE B8 AD 01 8C
0AC9:1C 99 00 01 C8 D0 F4 20 F5
0AD1:E0 F8 A9 22 A6 38 E4 47 13
0AD9:D0 CC 20 E9 F5 AA A9 27 01
0AE1:E4 3A D0 C2 60 A0 00 B9 7C
0AE9:00 07 99 00 03 C8 C0 AA 5A
0AF1:D0 F5 A9 00 99 00 03 C8 BC
0AF9:D0 FA A2 12 86 18 86 80 CC
0B01:84 19 20 EF 04 A5 87 85 ED
0B09:19 20 6F 06 A2 00 A4 86 E6
0B11:C0 FF D0 0F 8A 9D 00 03 60
0B19:E8 D0 FA 8E 00 03 8C 01 46
0B21:03 A0 00 BD EA 07 99 02 65
0B29:03 C8 E8 E0 13 D0 F4 A5 89
0B31:88 99 0B 03 20 EF 04 4C 98
0B39:E2 04 A0 00 78 A9 00 8D CD
0B41:00 18 A9 04 2C 00 18 D0 35
0B49:FB A2 04 48 68 EA EA EA BA
0B51:EA EA EA EA EA AD 00 02
0B59:18 6A 26 21 6A 6A 26 21 57
0B61:CA D0 EF A5 21 99 00 04 DC
0B69:C8 D0 D7 A9 02 8D 00 18 0C
0B71:60 20 AB 07 4C 00 04 A4 B4
0B79:3A C8 D0 03 20 93 F6 20 86
0B81:43 A5 A9 49 20 A8 FF 20 30
0B89:AE FF A5 90 29 80 F0 06 E7
0B91:A9 05 38 4C D4 02 AE 0E A3
0B99:DC AC 11 D0 86 27 84 28 7A
0BA1:A2 00 8E 0E DC 8E 11 D0 CF
0BA9:A9 AB 85 FD 20 A1 A5 20 03
0BB1:A3 A5 A9 45 20 8F A5 A9 C0
0BB9:E2 20 A8 FF A9 07 20 A8 B0
0BC1:FF 20 AE FF A9 17 8D 00 7A
0BC9:DD A0 00 EA 88 D0 FD 84 AD
0BD1:FB A9 A1 85 FC 20 38 A5 5B
0BD9:20 4D A5 E6 FC 20 38 A5 F4
0BE1:20 4D A5 E6 FC 20 38 A5 FC
0BE9:20 4D A5 A9 82 8D EA A0 73
0BF1:A2 00 A0 01 B1 BB C9 3A C7
0BF9:D0 02 C8 C8 88 B1 BB 9D BE
0C01:ED A0 E8 C8 C4 B7 D0 F5 7E
0C09:A9 A0 E0 10 B0 06 9D ED 02
0C11:A0 E8 D0 F6 A0 E8 20 4F 75
0C19:A5 A6 C1 A4 C2 8E 02 A0 25
0C21:8C 03 A0 86 FB 84 FC A2 4B
0C29:04 20 12 A5 98 48 20 4D 5B
0C31:A5 68 AA F0 04 A2 02 D0 1A
0C39:F0 2C 00 DD 10 FB A6 27 97
0C41:A4 28 8E 0E DC 8C 11 D0 74
0C49:18 4C 59 A4 A0 00 B1 FB 5A
0C51:9D 00 A0 E6 FB D0 02 E6 C8
0C59:FC A5 FC C5 AF D0 0D A5 D5
0C61:FB C5 AE D0 07 8E 01 A0 E0
0C69:8C 00 A0 60 E8 D0 DF 88 B4
0C71:D0 F6 A0 00 B1 FB 99 00 74
0C79:A0 C8 D0 F8 60 A5 BA 20 EC
0C81:B1 FF A9 FF 4C 93 FF A0 F8
0C89:00 2C 00 DD 10 FB B9 00 6E
0C91:A0 85 95 18 AD 12 D0 E9 D0
0C99:30 90 06 29 07 C9 02 90 35
0CA1:F3 A9 07 8D 00 DD A2 04 98
0CA9:A9 00 06 95 2A 06 95 2A 6F
0CB1:0A 0A 0A 0A 8D 00 DD CA 26
0CB9:D0 EE A9 17 48 68 48 68 79
0CC1:48 68 8D 00 DD C8 D0 C6 44
0CC9:60 48 20 43 A5 A9 4D 20 EA
0CD1:A8 FF A9 2D 20 A8 FF 68 52
0CD9:4C A8 FF A0 00 A9 57 20 C1
0CE1:8F A5 A5 FD 20 A8 FF A9 0D
0CE9:07 20 A8 FF A9 20 AA 20 E5
0CF1:A8 FF B9 00 A4 20 A8 FF 8C
0CF9:C8 E6 FD CA D0 F4 4C AE 3E
0D01:FF A2 CD A0 02 8E 32 03 39
0D09:8C 33 03 4C D4 02 A9 36 93
0D11:85 01 4C C7 A5 A9 36 85 F9
0D19:01 4C 3D A4 A0 37 84 01 A4
0D21:A4 3A C8 D0 03 4C 74 A4 19
0D29:60 00 00 00 00 00 00 00 73
```

List Formatter

Article on page 74.

Program 1: LIST Formatter—64 Version

```
FF 10 FORI=53020TO53243:READA:
      POKEI,A:X=X+A:NEXTI
MH 20 IFX<>30512THENPRINT"DATA
      STATEMENT ERROR.":STOP
DS 30 DATA 76,170,207,76,211,2
      07,140,206,207,142
RR 40 DATA 205,207,141,204,207
      ,165,95,205,207,207
EH 50 DATA 208,7,165,96,205,20
      8,207,240,27,165
DD 60 DATA 95,141,207,207,165,
      96,141,208,207,173
FD 70 DATA 202,207,24,229,97,2
      33,1,170,169,32
GX 80 DATA 32,210,255,202,16,2
      50,173,204,207,36
SE 90 DATA 15,48,3,76,100,207,
      32,232,207,76
DP 100 DATA 26,167,173,203,207
      ,201,58,208,15,32
SM 110 DATA 215,170,169,32,174
      ,202,207,202,32,210
HK 120 DATA 255,202,16,250,173
      ,204,207,201,129,208
KJ 130 DATA 15,173,202,207,201
      ,15,176,8,238,202
PQ 140 DATA 207,169,32,32,210,
      255,173,204,207,201
BC 150 DATA 130,208,10,173,202
      ,207,201,7,144,3
BB 160 DATA 206,202,207,32,232
      ,207,141,203,207,76
AB 170 DATA 26,167,162,34,142,
      6,3,160,207,140
CM 180 DATA 7,3,169,242,141,2,
      3,169,207,141
EC 190 DATA 3,3,169,0,141,203,
      207,141,207,207
PC 200 DATA 141,208,207,96,0,0
      ,0,0,0,0
BM 210 DATA 0,0,0,169,26,141,6
      ,3,169,167
JD 220 DATA 141,7,3,169,131,14
      1,2,3,169,164
EM 230 DATA 141,3,3,96,172,206
      ,207,174,205,207
KX 240 DATA 173,204,207,96,72,
      169,6,141,202,207
AP 250 DATA 104,76,131,164
```

Program 2: LIST Formatter—128 Version

```
XX 10 FORI=3072TO3293:READA:PO
      KEI,A:X=X+A:NEXTI
CD 20 IFX<>22851THENPRINT"DATA
      STATEMENT ERROR.":STOP
PQ 30 DATA 76,142,12,76,183,12
      ,140,178,12,142
KP 40 DATA 177,12,141,176,12,1
      65,97,205,179,12
RQ 50 DATA 208,7,165,98,205,18
      0,12,240,27,165
XA 60 DATA 97,141,179,12,165,9
      8,141,180,12,173
```

```
EK 70 DATA 174,12,24,229,99,23
      3,1,170,169,32
MD 80 DATA 32,210,255,202,16,2
      50,173,176,12,36
AM 90 DATA 17,48,3,76,72,12,32
      ,202,12,76
JM 100 DATA 81,81,173,175,12,2
      01,58,208,15,32
EF 110 DATA 152,85,169,32,174,
      174,12,202,32,210
SD 120 DATA 255,202,16,250,173
      ,176,12,201,129,208
AC 130 DATA 15,173,174,12,201,
      15,176,8,238,174
JC 140 DATA 12,169,32,32,210,2
      55,173,176,12,201
JH 150 DATA 130,208,10,173,174
      ,12,201,7,144,3
XA 160 DATA 206,174,12,32,202,
      12,141,175,12,76
PR 170 DATA 81,81,162,6,142,6,
      3,160,12,140
PK 180 DATA 7,3,169,212,141,2,
      3,169,12,141
MJ 190 DATA 3,3,169,0,141,175,
      12,141,179,12
KX 200 DATA 141,180,12,96,0,0,
      0,0,0,0
GM 210 DATA 0,0,0,169,81,141,6
      ,3,141,7
BF 220 DATA 3,169,198,141,2,3,
      169,77,141,3
MG 230 DATA 3,96,172,178,12,17
      4,177,12,173,176
QF 240 DATA 12,96,72,169,6,141
      ,174,12,104,76
DC 250 DATA 198,77
```

Program 3: LIST Formatter—Plus/4 and 16 Version

```
ME 10 POKE56,63:POKE55,0:CLR:F
      ORI=16150TO16373:READA:P
      OKEI,A:X=X+A:NEXTI
FQ 20 IFX<>25417THENPRINT"DATA
       STATEMENT ERROR.":STOP
FK 30 DATA 76,164,63,76,205,63
      ,140,200,63,142
GE 40 DATA 199,63,141,198,63,1
      65,95,205,201,63
GR 50 DATA 208,7,165,96,205,20
      2,63,240,27,165
CJ 60 DATA 95,141,201,63,165,9
      6,141,202,63,173
XR 70 DATA 196,63,24,229,97,23
      3,1,170,169,32
XM 80 DATA 32,210,255,202,16,2
      50,173,198,63,36
GJ 90 DATA 15,48,3,76,94,63,32
      ,226,63,76
AG 100 DATA 110,139,173,197,63
      ,201,58,208,15,32
HE 110 DATA 62,144,169,32,174,
      196,63,202,32,210
KS 120 DATA 255,202,16,250,173
      ,198,63,201,129,208
ME 130 DATA 15,173,196,63,201,
      15,176,8,238,196
AK 140 DATA 63,169,32,32,210,2
      55,173,198,63,201
EH 150 DATA 130,208,10,173,196
      ,63,201,7,144,3
KH 160 DATA 206,196,63,32,226,
      63,141,197,63,76
RD 170 DATA 110,139,162,28,142
      ,6,3,160,63,140
HP 180 DATA 7,3,169,236,141,2,
      3,169,63,141
BJ 190 DATA 3,3,169,0,141,197,
      63,141,201,63
MR 200 DATA 141,202,63,96,0,0,
      0,0,0,0
HM 210 DATA 0,0,0,169,110,141,
      6,3,169,139
KA 220 DATA 141,7,3,169,18,141
      ,2,3,169,135
AF 230 DATA 141,3,3,96,172,200
      ,63,174,199,63
AH 240 DATA 173,198,63,96,72,1
      69,6,141,196,63
KS 250 DATA 104,76,18,135
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

TurboSave 128

See instructions in article on page 70 before typing in.

```
0C00:4C 48 0D 08 85 06 86 07 CA
0C08:84 08 BA BD 02 01 85 64 1B
0C10:18 69 02 9D 02 01 BD 03 3B
0C18:01 85 65 90 03 FE 03 01 E2
0C20:68 AA 20 30 0C 08 48 A9 D8
0C28:00 8D 00 FF EA 68 28 60 4D
0C30:A0 02 B1 64 48 88 B1 64 C1
0C38:48 8A 48 A6 07 A4 08 A9 0F
0C40:40 8D 00 FF EA A5 06 40 16
0C48:08 85 06 86 07 84 08 BA 04
0C50:BD 02 01 85 64 18 69 02 98
0C58:9D 02 01 BD 03 01 85 65 48
0C60:90 03 FE 03 01 68 AA 20 B0
0C68:75 0C 08 48 A9 40 8D 00 2D
0C70:FF EA 68 28 60 A0 02 B1 0E
0C78:64 48 88 B1 64 48 8A 48 A2
0C80:A6 07 A4 08 A9 00 8D 00 2B
0C88:FF EA A5 06 40 20 03 0C 05
0C90:E1 0D 90 03 4C 4E F5 60 07
0C98:20 48 0C 9E 0C 60 AD 1C 97
0CA0:0A 29 BF 8D 1C 0A 60 20 C2
0CA8:48 0C AD 0C 60 AD 1C 0A 5A
0CB0:60 00 00 00 00 00 00 00 F8
0CB8:00 00 00 00 00 00 00 00 D0
0CC0:00 00 00 00 00 00 00 00 D8
0CC8:00 00 00 00 00 00 00 00 E0
0CD0:00 00 00 00 00 00 00 00 E8
0CD8:00 00 00 00 00 00 00 00 F0
0CE0:00 00 00 00 00 00 00 00 F8
0CE8:00 00 00 00 00 00 00 00 01
0CF0:00 00 00 00 00 00 00 00 09
0CF8:00 00 00 00 00 00 00 00 11
0D00:4C 35 13 4C 84 0F 4C FE AC
0D08:11 4C 01 12 4C 94 12 4C 24
0D10:D1 11 4C 07 11 4C CA 0F AF
0D18:4C 7E 11 4C A9 0F 4C 4C 4D
0D20:12 4C 8D 0C 13 0E 00 08 A1
0D28:80 82 04 62 13 06 13 07 A7
0D30:13 02 00 54 55 52 42 4F 61
0D38:53 41 56 45 A0 A0 A0 A0 D4
0D40:A0 A0 A0 4C 02 00 00 01 BC
0D48:A9 8D A2 0C CD 32 03 D0 BD
0D50:05 EC 33 03 F0 4D AC 32 07
0D58:03 8C 95 0C AC 33 03 8C 4F
0D60:96 0C 8D 32 03 8E 33 03 59
0D68:A9 0C 85 6C A9 6B 8D B9 A1
0D70:02 A0 00 84 6B B9 00 0C 4A
0D78:A2 00 20 AF 02 C8 D0 F5 AD
0D80:A2 00 A0 16 86 2F 84 30 8B
0D88:86 31 84 32 86 33 84 34 24
0D90:A2 02 BD B9 0D 95 6A CA 2E
0D98:10 F8 A9 6A A2 09 A0 10 5F
0DA0:20 B3 0D A0 00 B9 CC 0D F0
0DA8:F0 08 20 48 0C D2 FF C8 3A
0DB0:D0 F3 60 20 48 0C 21 C0 B3
0DB8:60 BC 0D 01 42 41 4E 4B E2
0DC0:31 3A 53 59 53 31 32 2A EF
0DC8:32 35 36 0D 0D 54 55 52 97
0DD0:42 4F 53 41 56 45 20 45 AB
0DD8:4E 41 42 4C 45 44 20 0D FF
0DE0:00 A5 BA C9 08 B0 02 38 97
0DE8:60 A2 10 A9 A0 9D 32 0D 65
0DF0:CA D0 FA A4 B7 F0 F0 88 3A
0DF8:30 09 20 48 0C AE F7 C9 CA
0E00:3A D0 F4 C8 C4 B7 F0 19 98
0E08:20 48 0C AE F7 C9 2A F0 DE
0E10:10 C9 2C F0 0C C9 3F F0 32
0E18:08 9D 33 0D E8 E0 10 90 52
0E20:E2 8A F0 C3 20 35 13 90 37
0E28:01 60 20 48 0C BC F5 20 C4
0E30:84 0F B0 40 20 94 12 B0 94
0E38:3B AD 2A 0D D0 3B AD 27 69
0E40:0D 48 A9 03 8D 27 0D A2 20
0E48:00 20 4F 0F AA 68 8D 27 80
0E50:0D 8A B0 20 AD 25 0D 8D 57
0E58:2A 0D A9 02 8D 2B 0D A0 F5
0E60:00 98 91 6D C8 D0 FB A0 CD
0E68:01 A9 FF 91 6D A2 00 20 9E
0E70:01 12 90 05 20 4C 12 18 62
0E78:60 20 07 11 B0 F6 A2 00 65
0E80:8E 31 0D 8E 32 0D A6 C6 94
0E88:BD F0 F7 85 6B A9 C1 8D 2A
0E90:AA 02 AD 47 0D 85 6D F0 F6
0E98:03 A0 FC 2C A0 FE 84 6E 39
0EA0:18 A5 AE E5 C1 AA A5 AF 1A
0EA8:E5 C2 90 10 D0 04 E4 6E 4A
0EB0:90 0C 20 CA 0F 90 11 20 C5
0EB8:4C 12 18 60 A2 00 E8 E8 58
0EC0:8E 2F 0D A9 00 8D 2E 0D CB
0EC8:EE 31 0D D0 03 EE 32 0D 9C
0ED0:20 E5 12 AD 26 0D 20 5E 97
0ED8:12 A9 01 20 5E 12 AD 24 45
0EE0:0D 20 5E 12 AD 25 0D 20 B4
0EE8:5E 12 AD 2E 0D 08 20 5E 78
0EF0:12 AD 2F 0D 28 D0 05 18 DE
0EF8:65 6D 65 6D 20 5E 12 46 8B
0F00:6D 90 0A A5 C1 20 5E 12 F1
0F08:A5 C2 20 5E 12 A0 00 A6 4D
0F10:6B 20 A2 02 20 5E 12 C8 C7
0F18:C4 6E 90 F3 20 0A 13 20 F4
0F20:7E 12 20 7E 12 C9 02 B0 5A
0F28:8E A5 C1 65 6E 85 C1 90 23
0F30:02 E6 C2 AD 2E 0D F0 0C CF
0F38:8D 24 0D AD 2F 0D 8D 25 90
0F40:0D 4C 9C 0E 20 7E 11 B0 3A
0F48:03 20 A9 0F 4C B7 0E 8E 02
0F50:45 0D 20 CA 0F B0 29 AD 40
0F58:45 0D AA 18 69 04 85 6E 08
0F60:A0 00 84 6D AD 2E 0D 91 08
0F68:6D C8 AD 2F 0D 91 6D 20 C1
0F70:01 12 B0 0C AD 2E 0D 8D 38
0F78:24 0D AD 2F 0D 8D 25 0D 8A
0F80:AE 45 0D 60 A9 12 8D 24 C3
0F88:0D A9 00 8D 25 0D A2 01 14
0F90:20 FE 11 B0 13 A0 03 B1 7E
0F98:6D 8D 28 0D F0 0A A9 35 DE
0FA0:8D 24 0D A2 02 20 FE 11 F9
0FA8:60 A9 12 8D 24 0D A9 00 25
0FB0:8D 25 0D A2 01 20 01 12 47
0FB8:B0 0F AD 28 0D F0 0A A9 15
0FC0:35 8D 24 0D A2 02 20 01 90
0FC8:12 60 A2 03 AD 25 0D 8D 36
0FD0:2F 0D AD 24 0D 8D 2E 0D C9
0FD8:20 D1 11 18 AD 2F 0D 6D D0
0FE0:27 0D CD 30 0D 90 07 ED 39
0FE8:30 0D F0 02 E9 01 8D 2F 3E
0FF0:0D AD 2E 0D C9 24 90 03 9A
0FF8:4C 7F 10 0A 0A A8 B9 00 26
1000:05 D0 23 8D 2F 0D C0 48 8B
1008:F0 46 90 0E 98 69 03 C9 5F
1010:90 90 EA A9 11 CA D0 E3 CD
1018:F0 65 98 E9 03 D0 DE A9 7E
1020:13 CA D0 D7 F0 59 98 8D BF
1028:43 0D 4A 4A 8D 2E 0D 20 7A
1030:D1 11 AD 2F 0D 8D 44 0D 5A
1038:AE 2F 0D EC 30 0D 90 14 D6
1040:A2 00 EC 44 0D 8E 44 0D CB
1048:8E 2F 0D D0 EB A9 71 60 73
1050:A9 72 38 60 8A 4A 4A 4A 4B
1058:38 6D 43 0D A8 8A 29 07 F1
```

```
1060:AA B9 00 05 3D F6 11 D0 4D
1068:05 EE 2F 0D D0 CA B9 00 A2
1070:05 5D F6 11 99 00 05 AE DF
1078:43 0D DE 00 05 18 60 AD 50
1080:28 0D F0 CC AC 2E 0D B9 D4
1088:B9 05 D0 21 8D 2F 0D C0 F6
1090:35 F0 BD 90 0C C8 C0 47 94
1098:90 ED A0 34 CA D0 E8 F0 30
10A0:AF 88 C0 24 B0 E1 A0 36 99
10A8:CA D0 DC F0 A3 98 8D 2E D5
10B0:0D 0A 6D 2E 0D E9 6B 8D DE
10B8:43 0D 98 20 D1 11 AD 2F 30
10C0:0D 8D 44 0D AE 2F 0D EC 5D
10C8:30 0D 90 10 A2 00 EC 44 8A
10D0:0D 8E 44 0D 8E 2F 0D D0 90
10D8:EB A9 71 60 8A 4A 4A 4A E9
10E0:18 6D 43 0D A8 8A 29 07 6A
10E8:AA B9 00 06 3D F6 11 D0 E5
10F0:05 EE 2F 0D D0 CE B9 00 3B
10F8:06 5D F6 11 99 00 06 AE EA
1100:2E 0D DE B9 05 18 60 A2 DF
1108:00 8E 2F 0D E8 8E 2E 0D 6F
1110:A9 12 38 ED 2E 0D F0 30 29
1118:0A 0A A8 B9 00 05 D0 12 3A
1120:A9 12 6D 2E 0D 0A 0A A8 79
1128:B9 00 05 D0 05 EE 2E 0D 22
1130:D0 DE 20 26 10 AE 2E 0D 7D
1138:8E 24 0D 8E 2C 0D AE 2F 57
1140:0D 8E 25 0D 8E 2D 0D 60 A5
1148:AD 28 0D D0 04 38 A9 72 C0
1150:60 8E 2E 0D A9 35 38 ED 5D
1158:2E 0D A8 B9 B9 05 D0 18 21
1160:A9 35 18 6D 2E 0D A8 B9 2F
1168:B9 05 D0 0C EE 2E 0D AD 7B
1170:2E 0D C9 12 90 DE B0 D5 7E
1178:20 AD 10 4C 35 11 A9 12 30
1180:8D 24 0D AD 2A 0D 8D 25 B4
1188:0D A2 00 20 FE 11 B0 40 B9
1190:AC 2B 0D A2 1E A9 00 99 D0
1198:00 04 C8 CA D0 F9 AC 2B 74
11A0:0D AD 29 0D 99 00 04 AD 2D
11A8:2C 0D 99 01 04 AD 2D 0D A5
11B0:99 02 04 AD 31 0D 99 1C 88
11B8:04 AD 32 0D 99 1D 04 BD 66
11C0:33 0D 99 03 04 C8 E8 E0 19
11C8:10 90 F4 A2 00 20 01 12 74
11D0:60 8E 30 0D A2 03 C9 24 76
11D8:90 02 E9 23 DD EE 11 B0 B0
11E0:03 CA D0 F8 BD F2 11 AE 6B
11E8:30 0D 8D 30 0D 60 01 12 19
11F0:19 1F 15 13 12 11 01 02 14
11F8:04 08 10 20 40 80 A9 00 7A
1200:2C A9 01 A8 8A 18 69 04 DA
1208:85 6E 20 E5 12 AD 26 0D 8D
1210:20 5E 12 98 08 20 5E 12 37
1218:AD 24 0D 20 5E 12 AD 25 7B
1220:0D 20 5E 12 A0 00 84 6D 3B
1228:28 F0 14 B1 6D 20 5E 12 F4
1230:C8 D0 F8 20 0A 13 20 7E 69
1238:12 20 7E 12 C9 02 60 20 95
1240:0A 13 20 7E 12 91 6D C8 94
1248:D0 F8 F0 EA A8 20 E5 12 83
1250:20 5E 12 98 09 80 20 5E D0
1258:12 20 0A 13 58 60 AA AD 47
1260:00 DD CD 00 DD D0 F8 45 1F
1268:6A 29 40 F0 F2 8E 0C DC E9
1270:A5 6A 49 40 85 6A A9 08 60
1278:2C 0D DC F0 FB 60 AD 00 5D
1280:DD 49 10 2C 0D DC 8D 00 A1
1288:DD A9 08 2C 0D DC F0 FB 83
1290:AD 0C DC 60 A2 00 8E 2A 8C
1298:0D A9 12 E8 8D 24 0D 8E 24
12A0:25 0D A2 00 20 FE 11 A0 AE
12A8:02 B1 6D D0 25 AD 2A 0D 36
12B0:D0 09 8C 2B 0D AD 25 0D 3A
12B8:8D 2A 0D 98 29 E0 18 69 BF
12C0:22 A8 90 E5 A0 01 B1 6D 6A
12C8:AA 88 B1 6D D0 CE 18 A9 0D
12D0:63 60 C8 C8 A2 FF C8 E8 F3
12D8:E0 10 B0 F3 BD 33 0D D1 6D
12E0:6D F0 F3 D0 D6 AD 05 D5 D0
12E8:09 08 8D 05 D5 A9 7F 8D 77
12F0:0D DC A9 00 8D 05 DC A9 EB
12F8:03 8D 04 DC AD 0E DC 29 D8
1300:80 09 55 8D 0E DC 2C 0D 75
1308:DC 60 AD 0E DC 29 80 09 E0
1310:08 8D 0E DC AD 05 D5 29 83
1318:F7 8D 05 D5 60 20 48 0C BB
1320:B1 FF 60 20 48 0C 93 FF C6
1328:60 20 48 0C A8 FF 60 20 76
1330:48 0C AE FF 60 A0 00 84 5D
1338:90 20 98 0C A5 BA 20 1D F7
1340:13 A9 FF 20 23 13 A9 55 6A
1348:20 29 13 A9 30 20 29 13 2D
1350:20 2F 13 A5 90 D0 07 20 05
1358:A7 0C 29 40 D0 02 38 60 DD
1360:A9 E7 85 6B A9 13 85 6C CD
1368:A2 00 A9 05 8E E4 13 8D 21
1370:E5 13 A5 BA 20 1D 13 A9 F3
1378:6F 20 23 13 A0 00 B9 E1 4E
1380:13 20 29 13 C8 C0 06 90 74
1388:F5 A0 00 B1 6B 20 29 13 2E
1390:C8 C0 20 90 F6 20 2F 13 02
1398:A9 00 C5 90 85 90 D0 D2 38
13A0:AD E4 13 18 69 20 8D E4 86
13A8:13 AD E5 13 69 00 8D E5 FD
13B0:13 A5 6B 69 20 85 6B 90 4C
13B8:02 E6 6C C9 BC A5 6C E9 03
13C0:15 90 AF A5 BA 20 1D 13 89
13C8:A9 6F 20 23 13 A9 55 20 DF
13D0:29 13 A9 43 20 29 13 20 A5
13D8:2F 13 A9 40 85 6A 78 18 73
13E0:60 4D 2D 57 E0 06 20 78 7D
13E8:AD 00 1C 09 08 8D 00 1C 8C
13F0:A0 00 84 1F 84 06 A9 12 8B
13F8:85 80 20 D2 05 C6 06 20 A2
1400:D2 05 20 88 05 85 2C 20 16
1408:88 05 A8 10 20 A5 1E 49 E8
1410:10 85 1E 98 29 7F C9 02 CB
1418:90 10 C9 66 F0 06 C9 10 6F
1420:B0 05 69 1E 4C 45 E6 4C 82
1428:C8 C1 4C 94 C1 20 88 05 9C
1430:85 80 20 88 05 85 81 98 A1
1438:F0 21 A0 00 20 88 05 99 FB
1440:00 03 C8 D0 F7 20 F8 05 86
1448:48 20 CE 81 A5 69 20 9E 40
1450:05 68 20 9E 05 20 B2 81 92
1458:4C 1B 05 20 CE 81 20 BE 8B
1460:05 48 A0 00 B9 00 03 20 25
1468:9E 05 C8 D0 F7 F0 DD AD 34
1470:00 18 49 08 2C 0D 40 8D EB
1478:00 18 A9 08 2C 0D 40 F0 63
1480:FB AD 0C 40 60 AA AD 00 A0
1488:18 CD 00 18 D0 F8 45 1F C5
1490:29 04 F0 F2 8E 0C 40 A5 66
1498:1F 49 04 85 1F A9 08 2C 57
14A0:0D 40 F0 FB 60 20 D2 05 6B
14A8:B0 0E A9 88 85 00 58 00 47
14B0:EA A5 00 30 FC 78 C9 02 1A
14B8:60 A5 81 85 07 A5 80 38 0B
14C0:F0 1C C9 47 B0 18 C5 06 8D
14C8:85 06 18 F0 11 A9 B0 85 5D
14D0:00 58 00 EA A5 00 30 FC 48
14D8:78 C9 02 2C A9 66 60 20 7A
14E0:D2 05 B0 15 A0 00 98 59 AA
14E8:00 03 C8 D0 FA 85 3A AD 08
14F0:00 1C 29 10 D0 04 A9 08 38
14F8:38 60 20 8F F7 20 7D 06 93
1500:B0 61 A0 09 2C 0F 18 30 7D
1508:FB 2C 00 1C 88 D0 F5 A9 1A
1510:FF 8D 03 1C AD 0C 1C 29 BE
1518:1F 09 C0 8D 0C 1C A9 FF 29
1520:A0 05 8D 01 1C 2C 0F 18 65
1528:30 FB 2C 00 1C 88 D0 F5 89
1530:A0 BB B9 00 01 2C 0F 18 BF
1538:30 FB 8D 01 1C C8 D0 F2 D3
1540:B9 00 03 2C 0F 18 30 FB 9F
1548:8D 01 1C C8 D0 F2 2C 0F 43
1550:18 30 FB AD 0C 1C 09 E0 B0
1558:8D 0C 1C A9 00 8D 03 1C C2
1560:85 50 18 60 A5 12 85 16 01
1568:A5 13 85 17 A5 06 85 18 B4
1570:A5 07 85 19 45 18 45 17 9D
1578:45 16 85 1A 20 34 F9 A9 8C
1580:5A 85 4B 20 BB 06 B9 24 32
1588:00 2C 0F 18 30 FB CD 01 2F
1590:1C D0 07 C8 C0 08 D0 EE 21
1598:18 60 C6 4B D0 E5 A9 02 E7
15A0:38 60 A2 0F A0 00 2C 00 A1
15A8:1C 10 0A 88 D0 F8 CA D0 7F
15B0:F5 A9 03 38 60 AD 01 1C FB
15B8:A0 00 18 60 00 00 00 00 3C
```

Skidders

Article on page 52.

```
XF 10  FAST:COLOR0,1:COLOR4,7:C
       OLOR1,8:GRAPHIC1,1
CK 20  S=2:SS=4:X=100:Y=100:X0=
       0:Y0=30:X2=319:Y2=150:VO
       L15:ENVELOPE2,1,1,1,8,3:
       ENVELOPE3,0,2,8,12,3
BG 30  MOVSPR1,0#0:MOVSPR1,120,
       130:SPRITE1,1,4,0,0,0,1:
       IFPEEK(3603)<>85THENCOLO
       R4,6:GOSUB320
AC 40  TT=2340:TY=39:CHAR1,12,0
       ,"- SKIDDERS -":CHAR1,31
       ,0,"TIME :":C$(1)="UNSTU
       CK":C$(2)="{2 SPACES}STU
       CK":C=1
PJ 50  CHAR1,0,24,"0%":CHAR1,18
       ,24,"50%":CHAR1,36,24,"1
       00%"
CX 60  DO:BOX1,X0,Y0,X2,Y2:X0=X
       0+4:Y0=Y0+3:X2=X2-4:Y2=Y
       2-3:I=I+1:LOOP UNTIL I=1
       0
MG 70  L=0:FORT=2TO5:MOVSPRT,T*
       40,10:SPRITET,1,T+2,0,0,
       0,1:NEXT
HQ 80  FORT=2TO5:A(T)=135+INT(R
       ND(1)*90)+1:NEXT:FORT=2T
       O5:MOVSPRT,A(T)#S:S(T)=2
       :NEXT:B=BUMP(1):TI$="000
       000":SLOW
KP 90  J=JOY(2):IFJANDJ<>128THE
       NMOVSPR1,J*45-45#4:ELSEM
       OVSPR1,0#0
GP 100 W=BUMP(2):IF(WAND1)THEN
       MOVSPR1,0#0:C=2
CA 110 IF(WAND1)<>1ANDC=2THENC
       =1
HP 120 IFC<>CATHENCHAR1,1,0,C$
       (C):CA=C:PLAY"T204E"
DD 130 GOSUB160:B=BUMP(1):IF(B
       AND1)THEN200:ELSEIFBTHE
       NB=BUMP(1)
FP 140 SS=1+INT(RND(1)*4)+1:IF
       RSPPOS(SS,1)<40ORRSPPOS
       (SS,1)>240THENGOSUB300
QB 150 IFV<TYTHEN90:ELSEGOTO28
       0
MF 160 TK$=TU$:V=VAL(RIGHT$(TI
       $,2)):TU$=STR$(TY-V):L=
       LEN(TU$):TU$=RIGHT$(TU$
       ,L-1):IFL<3THENTU$="0"+
       TU$
JE 170 CHAR1,37,0,TU$:IFTU$<>T
       K$THENQ$=Q$+"{+}":GOTO1
       90
BB 180 RETURN
EA 190 COLOR1,6:CHAR1,0,23,Q$,
       1:COLOR1,8:RETURN
RR 200 FORT=1TO5:MOVSPRT,A(T)#
       1:NEXT
GB 210 IFB=3THENN=2:ELSEIFB=5T
       HENN=3:ELSEIFB=9THENN=4
       :ELSEIFB=17THENN=5
MP 220 IFNTHEN230:ELSESPRSAV1,
       E$:PLAY"T302QD":FORT=6T
       O8:SPRSAVT,1:NEXT:SPRIT
       E1,0:SPRSAVE$,1:GOTO240
BS 230 SPRSAV1,E$:SPRSAVN,F$:P
       LAY"T302QD":FORT=6TO8:S
       PRSAVT,1:SPRSAVT,N:NEXT
       :SPRITE1,0:SPRITEN,0:SP
       RSAVE$,1:SPRSAVF$,N
```

```
PE 240 CHAR1,15,8,"TOUGH LUCK"
RA 250 CHAR1,12,10,"ANOTHER TR
       Y Y/N?"
FR 260 GETKEYA$:IFA$="Y"THENRU
       N:ELSEIFA$<>"N"THEN260
FA 270 GRAPHIC0,1:PRINT"
       {6 DOWN} MISSION ENDED"
       :FORT=1TO5:MOVSPRT,0#0:
       SPRITET,0:NEXT:END
XX 280 FORT=2TO8:PLAY"T5O1QE":
       SPRITE1,,T:FORG=1TO10:N
       EXT:NEXT:SPRITE1,0,4:SO
       UND1,6000,6
SD 290 COLOR4,6:CHAR1,15,8,"YO
       U WIN!!":GOTO250
KQ 300 MOVSPRSS,0#0:S(SS)=S(SS
       )+1:IFS(SS)>12THENS(SS)
       =12
AF 310 MOVSPRSS,INT(RND(1)*360
       )+1#S(SS):RETURN
FB 320 COLOR4,8:FORT=3584TO4095
       :POKET,0:NEXT:COLOR4,3
CQ 330 DO:READH$:IFH$="-1"THEN
       EXIT
XQ 340 L$=LEFT$(H$,2):R$=RIGHT
       $(H$,2):POKE3584+DEC(L$
       ),DEC(R$):LOOP
DG 350 FORT=2TO4:SPRSAVT,T+4:N
       EXT:FORT=2TO5:SPRSAV1,T
       :NEXT:COLOR4,7:RETURN
MF 360 DATA 1355,1501,16AA,174
       0,1806,19AA,1A90,1B06
RG 370 DATA 1CAA,1D90,1E06,1FA
       A,2090,2106,22AA,2390
PE 380 DATA 2406,25AA,2690,270
       7,28AA,29D0,2A01,2BFF
PX 390 DATA 2C40,2E55,4D41,4F0
       4,5202,5311,56AA,5740
SJ 400 DATA 5806,592A,5A91,5B0
       A,5CA2,5D80,5E42,5F2A
EB 410 DATA 6088,6106,62AA,640
       6,65A2,6698,6707,682A
JB 420 DATA 6910,6A01,6BFE,6C4
       0,6E11,6F0C,7020,7301
AB 430 DATA 7404,8440,8840,891
       0,8D01,9110,9202,9310
JQ 440 DATA 9520,96AA,9701,980
       2,9928,9A20,9B80,9CA2
SQ 450 DATA 9E02,9F2A,A008,A12
       0,A2A8,A5A0,A610,A710
GF 460 DATA A828,ABC0,AC40,AD0
       4,AE01,AF04,B130,B380
PE 470 DATA B44C,B503,B901,BA0
       1,C5C0,C930,CDC0,D003
HG 480 DATA D10C,D530,D688,D92
       0,DC82,DF08,E120,E280
EM 490 DATA E520,E630,E808,ED0
       C,EEC0,F103,F430,F530
CE 500 DATA FAC0,-1
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Screen Mapper

Article on page 73.

```
FJ 10 PR=1:REM SET PR=0 FOR 15
      26 SERIES, PR=1 FOR 1525
       SERIES
MA 20 SM=1024:CM=55296:REM SM=
      3072:CM=2048 ON THE PLUS
       4/16
ES 30 B$=CHR$(8):C1$=CHR$(14):
      C$=CHR$(15):REM PRINTER
      {SPACE}CODES
DC 40 IFPR=0THENB$=""
HE 50 D$=CHR$(207):E$=CHR$(165
      ):F$=CHR$(163)
QQ 60 PRINT"{CLR}":PRINT"{UP}
      {RVS}{11 SPACES}MEMORY M
      AP PRINTER{11 SPACES}"
AK 70 PRINT"{5 DOWN}{2 RIGHT}
      {RVS} 1 {OFF} SMALL SCRE
      EN MAP"
JH 80 PRINT"{2 RIGHT}{RVS} 2
      {OFF} SMALL COLOR MAP"
SE 90 PRINT"{2 RIGHT}{RVS} 3
      {OFF} SMALL GRAPHIC 320
      {SPACE}X 200 MAP"
HX 100 PRINT"{2 RIGHT}{RVS} 4
       {SPACE}{OFF} LARGE SCRE
       EN MAP"
KK 110 PRINT"{2 RIGHT}{RVS} 5
       {SPACE}{OFF} LARGE COLO
       R MAP"
XS 120 PRINT"{2 RIGHT}{RVS} 6
       {SPACE}{OFF} LARGE GRAP
       HICS MAP"
BK 130 PRINT"{2 RIGHT}{RVS} 7
       {SPACE}{OFF} QUIT"
GR 140 PRINT"{2 DOWN}{2 RIGHT}
       MAKE YOUR SELECTION"
RE 150 GETA$:IFA$=""THEN150
GA 160 A=ASC(A$)-48:IFA=7THEN2
       10:IFA<1ORA>6THEN150
KA 170 GOSUB490:ONAGOSUB220,23
       0,240,340,360,380
ES 180 PRINT"{CLR}{12 DOWN}
       {2 RIGHT}PRINT ANOTHER
       {SPACE}?"
FR 190 GETA$:IFA$=""THEN190
RF 200 IFA$="Y"THEN60
FA 210 PRINT"{CLR}":END
BS 220 S$="SCREEN":S=SM:GOSUB6
       20:RETURN
HP 230 S$="COLOR":S=CM:GOSUB62
       0:RETURN
EX 240 PRINT#4,C1$"SMALL GRAPH
       ICS MAP"
DH 250 X=24:GOSUB500
AM 260 PRINT#4,"0{3 SPACES}.
       {4 SPACES}1{4 SPACES}.
       {4 SPACES}2{4 SPACES}.
       {4 SPACES}3"
AM 270 PRINT#4,"{9 SPACES}0
       {9 SPACES}0{9 SPACES}0"
EP 280 PRINT#4,"{9 SPACES}0
       {9 SPACES}0{9 SPACES}0"
HF 290 FORI=10TO200STEP10:PRIN
       T#4,C$;
AP 300 FORX=1TO32:PRINT#4,D$;:
       NEXT:PRINT#4,"T";:PRINT
       #4,I;B$
PK 310 NEXTI
KS 320 PRINT#4,C$"[32 T]"
DB 330 GOSUB520:RETURN
PR 340 PRINT#4,C1$"{10 SPACES}
       LARGE SCREEN MAP"
RJ 350 X=22:GOSUB500:S=SM:S$=S
       TR$(S):GOSUB530:RETURN
JA 360 PRINT#4,C1$"{10 SPACES}
       LARGE COLOR MAP"
EP 370 X=22:GOSUB500:S=CM:S$=S
       TR$(S):GOSUB530:RETURN
HJ 380 PRINT#4,C1$"{9 SPACES}L
       ARGE GRAPHICS MAP"
SR 390 X=18:GOSUB500
EM 400 PRINT#4,"[A]C THIS BLOC
       K IS ADDRESS 0,0. ADD 1
       0 GOING DOWN AND ACROSS
       "B$
EC 410 PRINT#4,C$"-"B$
PR 420 FORX=10TO200STEP10
BA 430 PRINT#4,C1$;:FORI=1TO32
       :PRINT#4,D$;:NEXTI
KD 440 PRINT#4,E$B$
MM 450 PRINT#4,C1$;:FORI=1TO33
       :PRINT#4,E$;:NEXTI
DJ 460 PRINT#4,B$:NEXTX
PS 470 PRINT#4,C1$"[32 T]"
CX 480 GOSUB520:RETURN
EE 490 PRINT"{CLR}{6 DOWN}PRIN
       TING...":OPEN4,4:RETURN
JJ 500 IFPR=0THENOPEN6,4,6:PRI
       NT#6,CHR$(X):CLOSE6
GM 510 PRINT#4,C$:RETURN
FF 520 PRINT#4,C$:PRINT#4:CLOS
       E4:RETURN
RD 530 PRINT#4,"[A]C THIS BLOC
       K STARTS AT"S$". ADD 40
        FOR EACH ROW YOU GO DO
       WN."B$
PS 540 PRINT#4,C$"-"B$:FORX=1T
       O25
RA 550 PRINT#4,C1$;:FORI=0TO39
PX 560 PRINT#4,D$;:NEXTI:PRINT
       #4,B$
FD 570 PRINT#4,C1$;:FORI=0TO39
SA 580 PRINT#4,E$;:NEXTI:PRINT
       #4,B$:NEXTX
RR 590 PRINT#4,C1$;:FORI=0TO39
BH 600 PRINT#4,F$;:NEXTI
FE 610 X=24:GOSUB500:FORX=STOS
       +960STEP40:PRINT#4,X:NE
       XT:GOSUB520:RETURN
FH 620 PRINT#4,C1$"{3 SPACES}S
       MALL "S$" MAP"
SP 630 P$="{6 SPACES}":IFS=CMT
       HENP$="{7 SPACES}"
MX 640 X=24:GOSUB500
FH 650 PRINT#4,P$"0{4 SPACES}.
       {4 SPACES}1{4 SPACES}.
       {4 SPACES}2{4 SPACES}.
       {4 SPACES}3{4 SPACES}."
BA 660 PRINT#4,P$"{10 SPACES}0
       {9 SPACES}0{9 SPACES}0"
RC 670 FORI=STOS+960STEP40
HM 680 PRINT#4,C$I;:FORX=0TO39
       :PRINT#4,D$;:NEXT:PRINT
       #4,"T"B$:NEXTI
QS 690 PRINT#4,C$P$"[40 T]"
AM 700 GOSUB520:RETURN
```

Omicron

Article on page 44.

Program 1: Omicron—BASIC section

```
QS 2 POKE 792,193
AC 10 IFPEEK(13274)<>169THENLO
      AD"OMICRON ML",8,1
JP 20 SYS13274
BX 27 POKE 808,234
XC 30 POKE56,48:CLR:BL=51908:F
      =15:SCR=1024
QE 40 IFPEEK(788)=0THENFORT=0T
      O149:READD$:NEXT:GOSUB15
      10:GOTO60
CH 50 GOSUB1200
KH 60 GOSUB1000
ES 70 GOSUB780
KS 80 GOSUB580
RG 90 SYS51838:POKE56322,255:I
      F(PEEK(53280)ANDF)=0THEN
      220
PE 100 LV=LV-1:POKE251,48
SB 110 FORT=0TO64:POKE163,0:PO
       KE164,3
DA 120 POKE53280,T:POKE53232,(
       3ANDT)+220
SK 130 NEXT
EG 140 POKE164,0:CS=CS+1
EF 150 IFLV=0THEN170
KA 160 GOTO80
JQ 170 POKE53178,0:POKE53179,0
```

```
JS 180 POKE53272,21:PRINT"
       {CLR}{9 DOWN}"SPC(11)"
       {CYN}G A M E{3 SPACES}O
        V E R"
BD 190 FORT=0TO2000:NEXT
DS 200 FORT=0TO7:SL=SL+PEEK(83
       2+T)*10↑(7-T):NEXT
XX 210 LD=DF:GOTO60
MJ 220 REM :::::::::: GAME WON
        ::::::::::
KS 230 IFL<15THEN430
KD 240 POKE53178,0:POKE251,48:
       POKE53281,1:FORT=2TO7:W
       (T)=PEEK(1442+T)-176:NE
       XT
DH 250 PRINT"{CLR}{WHT},,,,,,,
       ,,,,,,,,,,,,,,,,,,,,,,,
       ,,,,,,,,,,":FORT=0TO9:P
       RINT:NEXT
MC 260 PRINTSPC(11)"{RVS}{BLK}
       CONGRATULATIONS!"
BC 270 PRINT"{RVS}"SPC(11)"CON
       GRATULATIONS[K]":FORT=0
       TO8:PRINT:NEXT
DJ 280 PRINT"{WHT},,,,,,,,,,,
       ,,,,,,,,,,,,,,,,,,,,,,,
       ,,,,,";
DM 290 FORT=0TO75
JD 300 X=INT(RND(1)*34+4):Y=IN
       T(RND(1)*19+3):PL=X+(Y*
       40)+SCR:IFPEEK(PL)<>32T
       HEN340
HA 310 POKEPL+54272,1:POKEPL+5
       4273,0
MF 320 POKEPL,39+RND(0)*2:POKE
       PL+1,8
XE 330 SYS49680:POKE53280,T
FG 340 NEXT
XG 350 PRINT"{CLR}":POKE53272,
       21
PR 360 POKE251,80:PRINT"
       {5 DOWN}{BLU}{7 SPACES}
       YOU HAVE SURVIVED OMICR
       ON!"
MB 370 PRINT"{DOWN}{RED}
       {7 SPACES}BONUS"(DF+1)*
       5000"POINTS AWARDED FOR
       "
DG 380 PRINT"{DOWN}{12 SPACES}
       EACH REMAINING SHIP."
HD 390 PRINT"{DOWN}{PUR} "LV"S
       HIPS *"(DF+1)*5000"="(D
       F+1)*5000*LV"EXTRA POIN
       TS."
DX 400 FORT=0TO4500:NEXT:POKE2
       51,48
QR 410 FORT=0TO7:POKE832+T,W(T
       ):NEXT
FF 420 POKE836,PEEK(836)+(DF+1
       )*5*LV:GOTO170
GC 430 REM :::::::: LEVEL COMP
       LETED ::::::
AX 440 POKE53178,1:POKE53179,0
EH 450 IFCS<>0THEN510
CB 460 POKE 808,234:PRINT"
       {HOME}{3 DOWN}{YEL}
       {RVS}{2 RIGHT}
       {36 SPACES}"
QJ 470 PRINT"{2 RIGHT}{RVS}
       {2 SPACES}BONUS 1000 FO
       R EXCELLENT PLAY !!
       {2 SPACES}"
DS 480 PRINT"{UP}{2 RIGHT}
       {RVS}{2 SPACES}BONUS
       [E][3 A] FOR EXCELLENT
       {SPACE}PLAY [2 K]
       {2 SPACES}"
XD 490 PRINT"{2 RIGHT}{RVS}
       {36 SPACES}"
XG 500 POKE251,64:FORT=0TO2000
       :NEXT:POKE251,0:POKE836
       ,PEEK(836)+1
EB 510 CS=0:L=L+1:IF(3AND(L))<
       >0THEN570
FQ 520 PRINT"{HOME}{17 DOWN}
       {RVS}{GRN}{10 RIGHT}
       {20 SPACES}"
RH 530 PRINT"{RVS}{10 RIGHT}
       {3 SPACES}BONUS SHIP !!
       !{3 SPACES}"
QS 540 PRINT"{RVS}{UP}
       {10 RIGHT}{3 SPACES}BON
       US SHIP [3 K]{3 SPACES}
       "
XP 550 PRINT"{RVS}{10 RIGHT}
       {20 SPACES}"
KA 560 POKE251,80:FORT=1TO2000
       :NEXT:POKE251,0:LV=LV+1
       :IFLV>9THENLV=9
JM 570 GOTO80
FJ 580 REM :::::: BETWEEN LEVE
       LS ::::::::
KF 590 IFCS>0THENPOKE53232,209
       :POKE53184,18:POKE53200
       ,60
AG 600 POKE53178,1:POKE53179,0
       :POKE251,48:POKE53216,1
QA 610 DR=INT(RND(0)*2)
BD 620 FORT=0TO7:POKE840+T,0:N
       EXT
RC 630 POKE844,L:POKE841,Q(DF,
       0,LANDF):POKE842,Q(DF,1
       ,LANDF):POKE165,Q(DF,2,
       LANDF)
KQ 640 SYS13262:POKE49408+32,3
SK 650 FORT=1TO15:POKE49408+32
       +T,1:POKE53232+T,216:PO
       KE53216+T,14
RC 660 POKE53200+T,RND(0)*48+1
       70:POKE53184+T,RND(0)*9
       0+40:POKE49408+48+T,DR
KJ 670 AD=0:IFDR=1THENPOKE4940
       8+96+T,2:AD=2
CC 680 POKE49408+T+80,T:POKE49
       408+7*16+T,((RND(0)*256
       )AND252)+AD
RR 690 NEXT
RD 700 POKE1531,LV+176:POKE157
       1,LV+240
AF 710 POKE1522,(L+1)/10+176:P
       OKE1562,(L+1)/10+240:LC
       =L+1
DG 720 IFLC>9THENLC=LC-10:GOTO
       720
GD 730 POKE1523,LC+176:POKE156
       3,LC+240
GJ 740 POKE164,80:POKE163,1
FJ 750 POKE49408,0:POKE49408+1
       6,0:SYS51908:FORT=0TO4:
       SYS49680:NEXT
BA 760 POKE53178,255:POKE53179
       ,255
BG 770 RETURN
SM 780 REM ::::::: NEW GAME SE
       TUP ::::::::
AK 790 POKE53280,0:LV=5
BH 800 L=0:SL=0:CS=0:PRINT"
       {CLR}":POKE53272,31:SYS
       51800
FH 810 FORT=0TO11:POKE828+T,0:
       NEXT
MB 820 FORT=53160TO53248:POKET
       ,0:NEXT
KA 830 X=16384+SCR:FORT=0TO255
       STEP4
HA 840 POKEX+T,RND(0)*25+134:P
       OKEX+T+1,RND(0)*48+58:P
       OKEX+T+2,RND(0)*25+16
FC 850 POKEX+T+3,RND(0)*48+170
       :NEXT
HR 860 PRINT"{CLR}{BLU},,,,,,,
       ,,,,,,,,,,,,,,,,,,,,,,,
       ,,,,,,,,,,";
FS 870 FORT=1TO8:PRINT","SPC(3
       8)",";:NEXT
HK 880 PRINT",{8 SPACES},,,,,,
       ,,,,,,,,,,,,,,,,
       {8 SPACES},";
XK 890 FORT=0TO3:PRINT",
       {8 SPACES},[7]
       {20 SPACES}{BLU},
       {8 SPACES},";:NEXT
AK 900 PRINT",{8 SPACES},,,,,,
       ,,,,,,,,,,,,,,,,
       {8 SPACES},";
JQ 910 FORT=1TO8:PRINT","SPC(3
       8)",";:NEXT
FA 920 PRINT"{BLU},,,,,,,,,,,,
       ,,,,,,,,,,,,,,,,,,,,,,,
       ,,,,,";
FB 930 PRINT"{BLU},,,,,,,,,,,,
       ,,,,,,,,,,,,,,,,,,,,,,,
       ,,,,";:POKE2023,44:POKE
       56295,6
JM 940 PRINT"{HOME}{10 DOWN}
       {RVS}"SPC(10)"[7]
       {4 SPACES}SCORE=000000
       {4 SPACES}"
JH 950 PRINT"{RVS}{UP}"SPC(10)
       "{4 SPACES}SCORE[X]
       [6 A]{4 SPACES}"
MR 960 PRINT"{RVS}"SPC(10)"
       {2 SPACES}LEVEL=00 SHIP
       S=0{2 SPACES}"
PH 970 PRINT"{RVS}{UP}"SPC(10)
       "{2 SPACES}LEVEL[X]
       [2 A] SHIPS[X][A]
       {2 SPACES}"
MK 980 POKE53184,18:POKE53200,
       60:POKE53232,209
CE 990 RETURN
AS 1000 REM :::::::: TITLE SCR
        EEN :::::::::
MR 1010 POKE53178,0:POKE53179,
        0:POKE251,48
HR 1020 POKE53280,0:POKE53281,
        0:PRINT"{CLR}";
MP 1030 L$(0)="ROOKIE":L$(1)="
        ADVANCED":L$(2)="PRO":
        L$(3)="EXPERT"
XQ 1040 SP$="[7]{RVS}{7 RIGHT}
        {27 SPACES}"
SX 1050 PRINT"{3 DOWN}"SP$:PRI
        NT"{RVS}"SPC(13)" O M
        {SPACE}I C R O N ":PRI
        NTSP$
XC 1060 PRINT"{DOWN}[6]
        {3 SPACES}SELECT A SKI
        LL LEVEL AND GET READY
        ."
BE 1070 PRINT"{2 DOWN}[1]"SPC(
        10)"YOUR SELECTIONS AR
        E...":SP=13
SF 1080 PRINTSPC(SP)"{WHT}
        {DOWN}F1 ... EXPERT"
EC 1090 PRINTSPC(SP)"F3 ... PR
        O"
XA 1100 PRINTSPC(SP)"F5 ... AD
        VANCED"
CB 1110 PRINTSPC(SP)"F7 ... RO
        OKIE"
HK 1120 IFSL>HYTHENHY=SL:WD=LD
SA 1130 PRINTSPC(2)"{DOWN}
        {CYN}LAST GAME'S SCORE
        :"SL"ON "L$(LD)"."
QR 1140 PRINTSPC(2)"HIGHEST SC
        ORE YET:"HY"ON "L$(WD)
        "."
FP 1150 A(3)=1:A(6)=2:A(5)=3:A
        (4)=4
PP 1160 Z=PEEK(203):IFZ>60RZ<3
        THEN1160
XG 1170 X=A(Z):DF=X-1
BH 1180 IFX<1THEN1160
MM 1190 RETURN
```

```
SG 1200 REM :::::: DOUBLE CHAR
        ACTERS ::::::
XK 1210 POKE 53280,0:POKE53281
        ,0
CR 1215 PRINT"{CLR}{10 DOWN}
        {YEL}CREATING NEW CHAR
        ACTER SET...PLEASE WAI
        T"
PG 1220 POKE56334,PEEK(56334)A
        ND254:POKE1,PEEK(1)AND
        251
CR 1230 B=15360:A=53252:FORK=0
        TO63:FORT=0TO3
QE 1240 POKEB+K*8+T*2,255-PEEK
        (53248+K*8+T):POKEB+1+
        K*8+T*2,255-PEEK(53248
        +K*8+T)
QE 1250 POKE15872+K*8+T*2,255-
        PEEK(A+K*8+T):POKE1587
        3+K*8+T*2,255-PEEK(A+K
        *8+T)
JP 1260 NEXT:NEXT:POKE1,55:POK
        E56334,1
MQ 1270 REM ::::::::: 16 SPRIT
        ES :::::::::
XC 1280 SA=51968+40
DB 1290 FORT=0TO149:READV$
DM 1300 L$=LEFT$(V$,1)
HX 1310 IFASC(L$)>64THENHN=ASC
        (L$)-55
PE 1320 IFASC(L$)<65THENHN=ASC
        (L$)-48
PQ 1330 R$=RIGHT$(V$,1)
RG 1340 IFASC(R$)>64THENLN=ASC
        (R$)-55
CM 1350 IFASC(R$)<65THENLN=ASC
        (R$)-48
KS 1360 B=HN*16+LN:POKESA+T,B:
        NEXT
AM 1370 POKE53265,27:POKE56333
        ,127:POKE788,0:POKE789
        ,203
DH 1380 POKESA+109,PEEK(648)+3
        :POKE53274,129
JK 1390 DATA A5,FD,29,01,AA,49
        ,01,A8,BD,B2,CF,8D,1C,
        D0
FR 1400 DATA BD,B4,CF,8D,1D,D0
        ,BD,B6,CF,8D,17,D0,BD,
        B8
FG 1410 DATA CF,8D,1B,D0,BD,BA
        ,CF,8D,15,D0,AD,1E,D0,
        99
XP 1420 DATA BC,CF,AD,1F,D0,99
        ,BE,CF,A9,01,8D,19,D0,
        A5
KD 1430 DATA FD,29,01,0A,0A,0A
        ,AA,A0,00,84,FE,A9,01,
        85
DA 1440 DATA FC,BD,C0,CF,0A,99
        ,00,D0,90,06,A5,FC,05,
        FE
HF 1450 DATA 85,FE,BD,D0,CF,99
        ,01,D0,8A,84,FF,29,07,
        A8
JD 1460 DATA BD,E0,CF,99,27,D0
        ,BD,F0,CF,99,F8,07,A4,
        FF
KA 1470 DATA 18,26,FC,E8,C8,C8
        ,C0,10,D0,CD,A5,FE,8D,
        10
XP 1480 DATA D0,AD,1F,D0,E6,FD
        ,A9,00,8D,12,D0,AD,0D,
        DC
CG 1490 DATA 29,01,F0,03,4C,31
        ,EA,4C,BC,FE
BG 1500 REM :::::::::: GAME SE
        TUP :::::::::
KK 1510 DIMQ(3,2,15)
EH 1520 FORD=0TO3:FORK=0TO2:FO
        RT=0TO15
PJ 1530 READV:IFK=2THENV=15-V
PJ 1540 IFK=1THENV=V*32+31
ES 1550 Q(D,K,T)=V:NEXT:NEXT:N
        EXT
KD 1560 RETURN
PS 1570 DATA 1,1,1,1,1,1,1,1,1
        ,1,2,2,2,2,2,2
CX 1580 DATA 1,1,2,2,3,3,4,4,5
        ,6,3,4,4,3,3,3
XR 1590 DATA 0,0,0,0,0,0,0,0,0,0
        ,0,0,0,0,0,0,0
AH 1600 DATA 1,1,1,1,1,1,2,2,2
        ,2,2,2,2,2,2,2
GX 1610 DATA 1,2,3,4,5,5,2,3,4
        ,4,5,5,7,6,6,6
MF 1620 DATA 0,1,1,1,1,1,1,1,1
        ,1,1,1,1,1,1,1
JE 1630 DATA 1,1,1,1,1,2,2,2,2
        ,2,2,3,3,3,3,3
DE 1640 DATA 3,4,5,7,7,2,3,3,4
        ,5,5,4,6,3,4,4
AG 1650 DATA 1,1,1,1,2,2,2,2,1
        ,1,2,2,1,2,2,2
QH 1660 DATA 4,4,4,3,3,2,2,1,3
        ,3,3,4,7,4,4,4
GJ 1670 DATA 1,3,5,2,3,6,7,7,3
        ,3,5,3,2,4,5,7
FG 1680 DATA 1,1,1,2,2,3,3,4,2
        ,3,1,2,2,2,2,3
```

Program 2: Omicron—ML section

See instructions in article on page 44 before typing in.

```
33CE:A2 00 8A 9D 00 C1 E8 E0 6B
33D6:80 D0 F8 60 A9 68 85 AE 7F
33DE:A9 39 85 AF A0 00 A2 00 5E
33E6:A9 90 85 B0 A9 C1 85 B1 13
33EE:B1 AE 91 B0 C8 D0 F9 E8 7D
33F6:E6 AF E6 B1 E0 0B D0 F0 7A
33FE:60 00 00 00 00 C0 00 00 98
3406:70 00 00 3C 00 00 1F 00 A8
340E:00 0F C0 00 7F F0 00 0F 21
3416:C0 00 1F 00 00 3C 00 00 B3
341E:70 00 00 C0 00 00 00 00 CA
3426:00 00 00 00 00 00 00 00 8E
342E:00 00 00 00 00 00 00 00 96
3436:00 00 00 00 00 00 00 00 9E
343E:00 00 00 00 00 00 38 00 17
3446:03 F8 00 3F F0 00 FF F0 DA
344E:00 0F F0 00 07 F0 00 0F A3
3456:E0 00 0E E0 00 00 60 00 BF
345E:00 60 00 00 60 00 00 00 E1
3466:00 00 00 00 00 00 00 00 CE
346E:00 00 00 00 00 00 00 00 D6
3476:00 00 00 00 00 00 00 00 DE
347E:00 00 00 00 00 06 00 00 FE
3486:06 00 00 0F 00 00 0F 00 01
348E:00 1F 80 00 3F C0 00 7F 4B
3496:E0 00 7F E0 00 F6 F0 00 2B
349E:C6 30 00 86 10 00 00 00 5F
34A6:00 00 00 00 00 00 00 00 0F
34AE:00 00 00 00 00 00 00 00 17
34B6:00 00 00 00 00 00 00 00 1F
34BE:00 00 00 00 00 E0 00 00 AA
34C6:FE 00 00 7F E0 00 7F FC A9
34CE:00 7F 80 00 7F 80 00 3F 64
34D6:C0 00 38 C0 00 38 00 00 93
34DE:18 00 00 18 00 00 00 00 D4
34E6:00 00 00 00 00 00 00 00 4F
34EE:00 00 00 00 00 00 00 00 57
34F6:00 00 00 00 00 00 00 00 5F
34FE:00 00 00 00 00 00 70 00 48
3506:01 E0 00 07 C0 00 1F C0 9E
350E:00 7F 80 00 FF F0 00 7F AB
3516:80 00 1F C0 00 07 C0 00 4E
351E:01 E0 00 00 70 00 00 00 C4
3526:00 00 00 00 00 00 00 00 90
352E:00 00 00 00 00 00 00 00 98
3536:00 00 00 00 00 00 00 00 A0
353E:00 00 18 00 00 18 00 00 0C
3546:38 00 00 38 C0 00 3F C0 95
354E:00 7F 80 00 7F 80 00 7F 26
3556:FC 00 7F E0 00 FE 00 00 39
355E:E0 00 00 00 00 00 00 00 39
3566:00 00 00 00 00 00 00 00 D0
356E:00 00 00 00 00 00 00 00 D8
3576:00 00 00 00 00 00 00 00 E0
357E:00 00 86 10 00 CF 30 00 5A
3586:EF 70 00 7F E0 00 7F E0 E3
358E:00 3F C0 00 1F 80 00 0F EA
3596:00 00 0F 00 00 06 00 00 FA
359E:06 00 00 00 00 00 00 00 0C
35A6:00 00 00 00 00 00 00 00 11
35AE:00 00 00 00 00 00 00 00 19
35B6:00 00 00 00 00 00 00 00 21
35BE:00 00 00 60 00 00 60 00 EF
35C6:00 60 00 0E E0 00 0F F0 40
35CE:00 07 F0 00 0F F0 00 FF 55
35D6:F0 00 3F F8 00 03 F8 00 2F
35DE:00 78 00 00 18 00 00 00 28
35E6:00 00 00 00 00 00 00 00 51
35EE:00 00 00 00 00 00 00 00 59
35F6:00 00 00 00 00 00 00 00 61
35FE:00 00 03 E0 00 07 F8 00 E5
3606:1F 1C 00 1F 00 00 0F C0 D9
360E:00 07 E0 00 07 E0 00 03 17
3616:F0 00 00 F8 00 30 F8 00 3D
361E:3F F0 00 0F E0 00 00 00 5E
3626:00 00 00 00 00 00 00 00 92
362E:00 00 00 00 00 00 00 00 9A
3636:00 00 00 00 00 00 00 00 A2
363E:00 00 0E 00 00 38 00 00 4D
3646:70 00 00 71 C0 00 7F F8 FF
364E:00 3F FC 00 1F FE 00 07 26
3656:E7 00 01 C3 00 00 07 00 21
365E:00 0E 00 00 7C 00 00 00 32
3666:00 00 00 00 00 00 00 00 D2
366E:00 00 00 00 00 00 00 00 DA
3676:00 00 00 00 00 00 00 00 E2
367E:00 00 00 00 00 00 00 00 EA
3686:C0 00 00 C0 78 00 C3 FC A7
368E:00 E7 FE 00 FF E7 00 7F F3
3696:E3 00 7F C3 00 1F 03 00 A3
369E:00 00 00 00 00 00 00 00 0B
36A6:00 00 00 00 00 00 00 00 13
36AE:00 00 00 00 00 00 00 00 1B
36B6:00 00 00 00 00 00 00 00 23
36BE:00 00 00 78 00 00 FC 00 AC
36C6:01 C6 00 03 E3 00 07 F3 B6
36CE:00 07 F0 00 07 F0 00 C3 DA
36D6:E0 00 61 C0 00 3F 80 00 E9
36DE:1F 00 00 00 00 00 00 00 DA
36E6:00 00 00 00 00 00 00 00 53
36EE:00 00 00 00 00 00 00 00 5B
36F6:00 00 00 00 00 00 00 00 63
36FE:00 00 00 00 00 00 00 00 6B
3706:00 00 00 01 E0 00 03 F0 82
370E:00 03 F0 00 03 F0 00 01 38
3716:E0 00 00 00 00 00 00 00 F4
371E:00 00 00 00 00 00 00 00 8C
3726:00 00 00 00 00 00 00 00 94
372E:00 00 00 00 00 00 00 00 9C
3736:00 00 00 00 00 00 00 00 A4
373E:00 00 00 00 00 1C 00 00 1D
3746:1F E0 00 0F FE 00 0F FC 80
374E:00 0F F8 00 0F F8 00 1F 1B
3756:F0 00 3D E0 00 38 70 00 B4
375E:00 30 00 00 00 00 00 00 D8
3766:00 00 00 00 00 00 00 00 D4
376E:00 00 00 00 00 00 00 00 DC
3776:00 00 00 00 00 00 00 00 E4
377E:00 00 F0 0C 00 7C 3C 00 36
3786:1F F8 00 0F FE 00 1E 3C 24
378E:00 7E 38 00 0F 3C 00 1F 2C
3796:FF 00 3D E3 00 78 70 00 AD
379E:F0 70 00 00 18 00 00 00 62
37A6:00 00 00 00 00 00 00 00 15
37AE:00 00 00 00 00 00 00 00 1D
37B6:00 00 00 00 00 00 00 00 25
37BE:00 00 F3 CE 00 7F FC 00 90
37C6:38 3C 00 F0 0F 00 F0 0F D8
37CE:00 F8 0F 00 38 0F 00 38 93
37D6:1E 00 3C 3C 00 7F F0 00 7F
37DE:F1 E0 00 70 78 00 00 00 49
```

```
37E6:00 00 00 00 00 00 00 00 55
37EE:00 00 00 00 00 00 00 00 5D
37F6:00 00 00 00 00 00 00 00 65
37FE:00 00 00 00 00 FF FF 00 6D
3806:00 00 00 00 00 00 07 1E A2
380E:78 E0 03 07 0E 1C 38 70 85
3816:E0 C0 38 38 38 70 70 F0 07
381E:E0 E0 18 18 18 18 18 18 25
3826:18 18 1C 1C 1C 0E 0E 07 2A
382E:07 07 C0 E0 70 38 1C 0E B4
3836:07 03 00 00 00 00 F0 3C 09
383E:0F 03 00 00 00 FF FF 00 F6
3846:00 00 07 1E 78 E0 00 00 C0
384E:00 00 03 07 0E 1C 38 70 51
3856:E0 C0 03 03 03 03 0C 0C 40
385E:0C 0C 18 18 18 18 18 18 C5
3866:18 18 C0 C0 C0 C0 30 30 A6
386E:30 30 C0 E0 70 38 1C 0E D3
3876:07 03 F0 3C 0F 03 00 00 91
387E:00 00 00 00 00 FF FF 00 EE
3886:00 00 07 1E 78 E0 00 00 01
388E:00 00 03 07 0E 1C 38 70 91
3896:E0 C0 07 07 0F 0E 0E 1C E1
389E:1C 1C 18 18 18 18 18 18 12
38A6:18 18 E0 E0 E0 70 70 38 35
38AE:38 38 C0 E0 70 38 1C 0E 1A
38B6:07 03 F0 3C 0F 03 00 00 D1
38BE:00 00 00 00 00 FF FF 00 2F
38C6:00 00 00 00 00 00 07 1E 63
38CE:78 E0 03 07 0E 1C 38 70 46
38D6:E0 C0 30 30 30 30 C0 C0 75
38DE:C0 C0 18 18 18 18 18 18 CD
38E6:18 18 0C 0C 0C 0C 03 03 45
38EE:03 03 C0 E0 70 38 1C 0E 72
38F6:07 03 00 00 00 00 F0 3C C9
38FE:0F 03 00 00 00 00 00 00 B7
3906:00 00 0C 00 30 0E 60 00 74
390E:1C 00 42 81 19 28 31 18 D2
3916:43 18 77 59 83 7A A9 96 A4
391E:B4 66 ED FC AE BC CC 97 AB
3926:EA 3E 18 3C 66 DB DB 66 25
392E:3C 18 F0 0F F0 0F F0 0F 88
3936:F0 0F C3 66 3C FF 3C 66 84
393E:C3 00 3F 3F 30 3E 3E 30 95
3946:30 30 3C C3 03 3C 30 30 3A
394E:00 30 00 FC E3 E3 FC E3 29
3956:E3 FC E7 E7 E7 3C 3C FF 1E
395E:FF FF EF D7 BB 7D FE FF 1E
3966:FF FF 08 09 01 05 04 06 94
396E:02 0A 03 03 00 83 83 83 8D
3976:00 03 00 83 83 83 00 03 0F
397E:03 03 01 02 03 28 29 2A A8
3986:2B 2C 50 51 53 54 78 79 0F
398E:7A 7B 7C A1 A2 A3 03 0D 7D
3996:04 07 01 03 05 07 09 0B 7E
399E:0D 0F 53 2B 2A 29 51 79 8A
39A6:7A 7B 10 11 12 13 14 15 62
39AE:16 17 18 19 1A 1B 1C 1D 19
39B6:1E 1F 00 01 02 03 04 05 39
39BE:06 07 08 09 0A 0B 0C 0D 29
39C6:0E 0F 53 53 2B 2A 2A 2A 24
39CE:29 51 51 51 79 7A 7A 7A 8E
39D6:7B 53 53 2B 2B 2B 2A 29 7C
39DE:29 29 51 79 79 79 7A 7B 14
39E6:7B 7B A9 D7 85 AE A2 00 D4
39EE:A9 03 85 AF A0 52 B1 AE 03
39F6:C9 20 B0 22 9D 00 40 A5 A1
39FE:AE 9D 00 41 A5 AF 9D 00 6B
3A06:42 18 48 69 D4 85 AF B1 0F
3A0E:AE 29 0F 9D 00 43 E8 68 27
3A16:85 AF A9 20 91 AE B1 AE C9
3A1E:C9 21 90 09 C9 25 B0 05 AB
3A26:38 E9 01 91 AE A5 AE C9 9D
3A2E:98 D0 06 A5 AF C9 07 F0 E1
3A36:08 E6 AE D0 B9 E6 AF D0 E4
3A3E:B5 A9 FF 9D 00 40 30 12 45
3A46:C0 52 F0 03 20 BE C3 A6 28
3A4E:02 20 FA C2 A6 02 EA 4C B6
3A56:E4 C2 A2 00 BD 00 40 C9 7A
3A5E:FF F0 5E A8 B9 D0 C1 85 7F
3A66:B3 B9 F0 C1 A8 BD 00 41 DA
3A6E:85 AE BD 00 42 85 AF 86 17
3A76:02 B1 AE C9 21 B0 1F C9 9E
3A7E:20 F0 06 A9 24 91 AE 10 6F
3A86:35 A5 B3 91 AE A5 AF 18 12
3A8E:69 D4 85 AF A6 02 20 08 1E
3A96:C4 91 AE 10 21 EA 20 E8 86
3A9E:C2 C9 25 90 19 C9 2B B0 8B
3AA6:15 C9 26 D0 9B A5 B3 49 0E
3AAE:18 91 AE 20 81 C5 69 D4 36
3AB6:85 AF A9 0F 91 AE E8 D0 E9
3ABE:9B 60 48 BD 00 43 C9 02 A0
3AC6:B0 02 68 60 68 A9 81 60 74
3ACE:EA 60 00 00 A5 AE 85 B0 74
3AD6:A5 AF 18 69 D4 85 B1 A0 64
3ADE:52 EA EA EA EA EA EA EA 07
3AE6:EA EA EA EA B1 AE C9 25 98
3AEE:D0 0F EE 46 03 A9 FF 20 B0
3AF6:2C CA A9 24 91 AE 38 B0 14
3AFE:D0 C9 27 D0 2E A5 AF 20 C7
3B06:4A CA AD 46 03 18 69 05 BE
3B0E:8D 46 03 A9 20 91 AE A2 1F
3B16:00 BD C8 C1 A8 B1 AE C9 64
3B1E:20 D0 09 BD C0 C1 91 AE B4
3B26:A9 0A 91 B0 E8 E0 08 D0 DC
3B2E:E8 F0 A2 C9 28 D0 26 EE 06
3B36:45 03 A9 FF 20 41 CA A9 8A
3B3E:20 91 AE A2 00 BC A8 C1 2F
3B46:B1 AE C9 20 D0 08 A9 24 9A
3B4E:91 AE A9 08 91 B0 E8 E0 F0
3B56:14 D0 EA 60 EA C9 29 D0 10
3B5E:15 20 35 CA A5 8F 29 03 7B
3B66:AA BD BC C1 A0 52 91 B0 77
3B6E:8A 18 69 25 91 AE C9 2A B4
3B76:D0 1D A9 FF 8D FF FF A9 E7
3B7E:20 91 AE 91 B0 A5 A2 29 E2
3B86:03 AA EE FF FF CA E0 FF F3
3B8E:D0 F8 A9 FF 8D FF FF 60 AD
3B96:C0 52 B0 15 84 AB 38 A9 56
3B9E:52 E5 AB 85 AC 38 A5 AE C5
3BA6:E5 AC 85 AE B0 02 C6 AF A1
3BAE:60 38 98 E9 52 18 65 AE 81
3BB6:85 AE 90 02 E6 AF 60 EA 6F
3BBE:EA EA 20 20 20 25 25 25 70
3BC6:26 20 26 26 27 26 27 27 C6
3BCE:27 28 28 28 25 2C 29 20 B6
3BD6:04 0C 00 08 29 29 29 29 3C
3BDE:29 29 BD 00 43 D0 02 A9 F6
3BE6:01 60 EA EA EA EA EA EA C5
3BEE:EA 4C 08 C3 4C 78 C5 4C 47
3BF6:07 C5 A2 00 BD 20 C1 F0 99
3BFE:F3 C9 03 D0 F2 BD 00 C1 9F
3C06:30 0A 18 7D C0 CF 9D C0 35
3C0E:CF 18 90 0D 38 29 7F 85 42
3C16:02 BD C0 CF E5 02 9D C0 47
3C1E:CF BD 10 C1 30 0A 18 7D 63
3C26:D0 CF 9D D0 CF 18 90 0D C8
3C2E:29 7F 85 02 BD D0 CF 38 F4
3C36:E5 02 9D D0 CF BD C0 CF A9
3C3E:C9 0F B0 10 BD 00 C1 29 11
3C46:7F 9D 00 C1 A9 0F 9D C0 87
3C4E:CF 20 00 C6 BD C0 CF C9 7D
3C56:A4 90 10 A9 A3 9D C0 CF C6
3C5E:20 00 C6 BD 00 C1 09 80 35
3C66:9D 00 C1 BD D0 CF C9 37 52
3C6E:B0 10 A9 38 9D D0 CF BD 89
3C76:10 C1 29 7F 9D 10 C1 20 55
3C7E:0D C6 BD D0 CF C9 DD 90 E5
3C86:10 A9 DC 9D D0 CF BD 10 38
3C8E:C1 09 80 9D 10 C1 20 0D E8
3C96:C6 BD C0 CF C9 2C 90 41 58
3C9E:C9 87 B0 3D BD D0 CF C9 62
3CA6:A8 B0 36 C9 70 90 32 20 4D
3CAE:4B C6 BD C0 CF C9 30 B0 F8
3CB6:02 A9 2B C9 82 90 02 A9 A0
3CBE:88 9D C0 CF BD D0 CF C9 92
3CC6:74 B0 02 A9 6F C9 A4 90 FC
3CCE:02 A9 A8 9D D0 CF EA EA 28
3CD6:EA EA EA EA EA EA EA EA 4F
3CDE:EA BD 20 C1 C9 03 F0 6A 03
3CE6:BC 20 C1 F0 65 84 B3 BD 6F
3CEE:60 C1 D0 11 FE C0 CF BC 8A
3CF6:70 C1 B9 00 44 DD C0 CF 3A
3CFE:B0 03 20 28 C6 BD 60 C1 C6
3D06:C9 01 D0 11 DE D0 CF BC 67
3D0E:70 C1 B9 00 44 DD D0 CF 73
3D16:90 03 20 28 C6 BD 60 C1 CF
3D1E:C9 02 D0 11 DE C0 CF BC 7F
3D26:70 C1 B9 00 44 DD C0 CF 6B
3D2E:90 03 20 28 C6 BD 60 C1 E7
3D36:C9 03 D0 11 FE D0 CF BC 19
3D3E:70 C1 B9 00 44 DD D0 CF A3
3D46:B0 03 20 28 C6 A4 B3 88 19
3D4E:D0 9B E8 E0 10 F0 03 4C D9
3D56:22 C4 60 AD 46 03 18 69 D1
3D5E:02 8D 46 03 A9 E5 85 BD E3
3D66:A9 E4 85 BE 18 A5 AF 60 A2
3D6E:18 1C 08 0C 0E 10 12 14 A6
3D76:18 1C 18 14 12 10 0E 0C 41
3D7E:08 06 28 24 20 1C 18 14 7B
3D86:10 0C 28 24 20 1C 18 14 09
3D8E:10 0C 60 30 20 10 58 28 3D
3D96:10 0C 50 28 10 08 50 40 2A
3D9E:30 20 00 00 00 00 00 00 39
3DA6:00 00 00 00 00 00 00 00 21
3DAE:00 00 A0 10 80 20 60 30 B3
3DB6:50 40 40 50 30 60 20 70 2A
3DBE:10 80 30 30 30 18 18 18 94
3DC6:50 50 28 28 28 28 20 20 47
3DCE:00 00 EA EA EA EA EA EA 19
3DD6:EA EA E0 00 D0 09 AD 3C DF
3DDE:03 49 FF 8D 3C 03 60 E0 95
3DE6:00 D0 08 AD 3D 03 49 FF F9
3DEE:8D 3D 03 60 EA EA 60 3D E6
3DF6:03 EE 10 C1 EE 10 C1 60 68
3DFE:60 EA BD 30 C1 D0 0F FE 8D
3E06:60 C1 BD 60 C1 29 03 9D 37
3E0E:60 C1 FE 70 C1 60 DE 60 BF
3E16:C1 BD 60 C1 29 03 9D 60 FB
3E1E:C1 DE 70 C1 60 BD D0 CF C8
3E26:38 E9 70 85 B1 BD D0 CF 95
3E2E:38 E9 A8 49 FF C5 B1 B0 16
3E36:02 85 B1 BD C0 CF 38 E9 C6
3E3E:2A 85 B0 BD C0 CF 38 E9 C2
3E46:87 49 FF C5 B0 B0 02 85 07
3E4E:B0 A5 B0 C5 B1 B0 0C 20 87
3E56:00 C6 BD 00 C1 49 80 9D 0E
3E5E:00 C1 60 20 0D C6 BD 10 68
3E66:C1 49 80 9D 10 C1 60 60 A8
3E6E:60 60 A2 00 8E 02 DC AD 6B
3E76:00 DC 29 0F 49 0F DD 90 13
3E7E:C1 D0 10 AD 00 DC 29 10 C2
3E86:D0 09 8A 18 69 D0 8D F0 1B
3E8E:CF 90 05 E8 E0 08 D0 DF EE
3E96:AD 00 DC 29 10 D0 08 A5 91
3E9E:B4 F0 03 20 DC C6 EA AD 99
3EA6:00 DC 29 10 D0 03 CA 86 2F
3EAE:AC 20 4A C7 60 60 AD C0 EF
3EB6:CF 85 AE AD D0 CF 85 AF AD
3EBE:20 1C C7 B1 B0 C9 21 B0 06
3EC6:23 AD F0 CF 29 07 0A 91 66
3ECE:B0 18 A5 B1 69 D4 85 B1 D4
3ED6:A9 00 91 B0 A5 BE D0 09 38
3EDE:A9 10 85 BD A9 70 8D BE A9
3EE6:00 E6 AC 60 A9 02 8D 20 49
3EEE:D0 E6 AC 60 EA EA A9 00 7F
3EF6:85 B0 A9 04 85 B1 A5 AF C5
3EFE:38 E9 2A 4A 4A 4A AA E0 AD
3F06:00 F0 0F 18 A5 B0 69 28 0F
3F0E:85 B0 90 02 E6 B1 CA 38 79
3F16:B0 ED A5 AE 38 E9 0A 4A CF
3F1E:4A A8 60 EA AE 3C 03 E0 F3
3F26:FB D0 01 E8 E0 04 D0 01 3F
3F2E:CA 8E 3C 03 AE 3D 03 E0 BE
3F36:FB D0 01 E8 E0 04 D0 01 4F
3F3E:CA 8E 3D 03 AD 00 DC 29 ED
3F46:01 D0 03 CE 3D 03 AD 00 18
3F4E:DC 29 02 D0 03 EE 3D 03 24
3F56:AD 00 DC 29 04 D0 03 CE 12
3F5E:3C 03 AD 00 DC 29 08 D0 DD
3F66:03 EE 3C 03 A9 FF 8D 02 44
3F6E:DC AD 3C 03 10 02 49 7F 19
3F76:8D 00 C1 AD 3D 03 10 02 E6
3F7E:49 7F 8D 10 C1 60 A5 AD BC
3F86:D0 03 20 98 C6 A9 00 85 1E
3F8E:AD 60 EA EA EA EA EA EA CB
3F96:EA 00 AD 4B 03 CD 49 03 D9
3F9E:B0 5F A2 00 8E 48 03 E8 26
3FA6:BD 20 C1 C9 01 D0 39 AD 4C
3FAE:4A 03 18 7D 40 C1 9D 40 72
3FB6:C1 90 03 FE 50 C1 BD 50 DF
3FBE:C1 C9 04 90 05 A9 03 9D 8C
```

```
3FC6:E0 CF BD 50 C1 C9 20 90 6C
3FCE:17 A9 07 9D E0 CF A9 02 99
3FD6:9D 20 C1 A5 A2 29 01 9D 18
3FDE:30 C1 EE 4B 03 38 B0 19 EB
3FE6:BD 20 C1 F0 07 C9 03 F0 E9
3FEE:03 EE 48 03 AD 48 03 CD 46
3FF6:49 03 B0 05 E8 E0 10 D0 FC
3FFE:A7 20 EB C8 A2 01 BD 20 18
4006:C1 F0 3F BD F0 CF 18 69 C7
400E:01 29 DB 9D F0 CF 86 02 84
4016:BD E0 CF C9 03 D0 0E 20 DB
401E:97 E0 A6 02 A5 8E 29 1F 70
4026:D0 03 20 80 C8 BD E0 CF AA
402E:C9 07 D0 03 20 BA C8 BD DA
4036:E0 CF C9 08 D0 0C A5 A2 79
403E:29 07 D0 03 20 80 C8 20 14
4046:BA C8 E8 E0 10 D0 B7 A5 5A
404E:B4 F0 02 A2 00 86 B4 4C 9F
4056:EA C8 BD D0 C0 85 B0 BD 7E
405E:E0 C0 85 B1 BC F0 C0 AD 24
4066:4C 03 29 0F 0A A6 A2 30 44
406E:03 18 69 01 AA B1 B0 C9 FA
4076:20 D0 16 BD E8 C3 91 B0 04
407E:E9 01 29 03 AA A5 B1 18 F0
4086:69 D4 85 B1 BD BC C1 91 B2
408E:B0 A6 02 60 BD D0 C0 85 8F
4096:B0 BD E0 C0 85 B1 86 02 09
409E:20 97 E0 A6 02 BC F0 C0 41
40A6:B1 B0 C9 20 D0 14 A5 8F 19
40AE:29 0F 91 B0 18 A5 B1 69 E8
40B6:D4 85 B1 A9 07 91 B0 EA 9E
40BE:EA EA A6 02 60 A2 01 BD B1
40C6:C0 CF 85 AE BD D0 CF 85 8D
40CE:AF 86 02 20 1C C7 A6 02 5A
40D6:A5 B0 9D D0 C0 A5 B1 9D B4
40DE:E0 C0 98 9D F0 C0 BD F0 E3
40E6:CF C9 DC 90 0F FE F0 CF 8C
40EE:C9 DF 90 08 A9 0E 9D F0 90
40F6:CF 9D F0 CF BD 20 C1 C9 9D
40FE:00 F0 4D B1 B0 C9 20 B0 1E
4106:02 90 07 C8 B1 B0 C9 20 1F
410E:B0 3E A5 B1 69 D4 85 B1 A3
4116:B1 B0 29 0F C9 02 B0 30 9B
411E:BD 20 C1 0A 18 6D 45 03 64
4126:8D 45 03 A9 00 9D 20 C1 34
412E:A9 DC 9D F0 CF 20 20 CA 89
4136:BD E0 C0 85 B1 A9 20 91 46
413E:B0 BD E0 CF C9 07 D0 03 B0
4146:CE 4B 03 A9 0A 9D E0 CF 56
414E:E8 E0 10 F0 03 4C ED C8 7C
4156:AD 4E 03 C5 A5 D0 33 A2 79
415E:01 BD 20 C1 F0 27 EE 4E 41
4166:03 A9 02 AC 4C 03 C0 03 D2
416E:90 01 EA C0 08 90 01 0A 71
4176:9D 00 C1 9D 10 C1 A9 03 B7
417E:9D 20 C1 A9 08 9D E0 CF F2
4186:A9 FF 8D FF FF E8 E0 10 05
418E:D0 CF AD C0 CF 85 AE AD CE
4196:D0 CF 85 AF 20 1C C7 A5 C7
419E:B1 85 AF 18 69 D4 85 B1 2E
41A6:B1 B0 29 0F C9 01 F0 13 8B
41AE:A5 AF 85 B1 B1 B0 C9 20 BF
41B6:F0 09 C9 2A F0 05 A9 02 C0
41BE:8D 20 D0 A2 07 BD 40 03 07
41C6:C9 0A 90 0A E9 0A FE 3F 18
41CE:03 9D 40 03 B0 EF 69 B0 3B
41D6:9D A2 05 69 40 9D CA 05 1B
41DE:CA E0 01 D0 E0 A0 00 AD 63
41E6:4B 03 F0 02 A0 10 AD 4E FC
41EE:03 C5 A5 90 02 A0 20 84 79
41F6:FB 60 A9 3E 85 BD A9 44 63
41FE:85 BE EE 4E 03 60 A9 95 39
4206:85 BD A9 8D 85 BE 60 20 D2
420E:97 E0 A9 21 85 BD A9 39 8D
4216:85 BE 60 A9 01 85 A3 A9 C2
421E:1E 85 A4 60 C9 08 B0 09 86
4226:A9 FD 85 A3 A9 FE 85 A4 E2
422E:60 60 A9 0F 8D 18 D4 A9 41
4236:F0 8D 06 D4 8D 14 D4 8D 98
423E:0D D4 A9 11 8D 04 D4 A9 94
4246:21 8D 0B D4 A9 81 8D 12 ED
424E:D4 A9 00 85 FB 85 A4 60 9F
4256:20 20 C4 20 98 C6 20 10 BD
425E:C2 4C BF CB 20 C0 C7 AD 4D
4266:60 39 48 A2 00 BD 61 39 8F
426E:9D 60 39 E8 E0 07 D0 F5 4A
4276:68 8D 67 39 AD 8D 02 D0 8B
427E:FB A9 0E 38 E5 A5 18 69 10
4286:10 CD 4E 03 D0 01 60 AD 79
428E:20 D0 29 0F F0 01 60 A5 5F
4296:CB C9 3E D0 BB 00 A9 00 79
429E:85 AE 85 B0 A9 04 85 AF 65
42A6:A9 D8 85 B1 A0 00 B1 B0 1B
42AE:29 0F C9 0E F0 0E C9 06 FE
42B6:F0 0A B1 AE C9 20 F0 04 0C
42BE:A9 24 91 AE E6 AE E6 B0 AE
42C6:D0 E4 E6 AF E6 B1 A5 AF BD
42CE:C9 08 D0 DA 60 A3 60 EA 3F
42D6:EA EA E6 FA A5 FA 29 0F 92
42DE:18 65 FB AA BD 98 C5 8D 5C
42E6:01 D4 A5 BE F0 05 38 E5 B3
42EE:BD 85 BE 8D 08 D4 A5 A4 E7
42F6:F0 03 38 E5 A3 85 A4 8D 24
42FE:0F D4 A5 FD 29 01 AA 49 C0
4306:01 A8 BD B2 CF 8D 1C D0 D7
430E:BD B4 CF 8D 1D D0 BD B6 D1
4316:CF 8D 17 D0 BD B8 CF 8D D5
431E:1B D0 BD BA CF 8D 15 D0 79
4326:AD 1E D0 99 BC CF AD 1F 5E
432E:D0 99 BE CF A9 01 8D 19 DD
4336:D0 A5 FD 29 01 0A 0A 0A 2F
433E:AA A0 00 84 FE A9 01 85 B0
4346:FC BD C0 CF 0A 99 00 D0 57
434E:90 06 A5 FC 05 FE 85 FE 51
4356:BD D0 CF 99 01 D0 8A 84 68
435E:FF 29 07 A8 BD E0 CF 99 45
4366:27 D0 BD F0 CF 99 F8 07 59
436E:A4 FF 18 26 FC E8 C8 C8 92
4376:C0 10 D0 CD A5 FE 8D 10 AC
437E:D0 AD 1F D0 E6 FD A9 00 4C
4386:8D 12 D0 AD 0D DC 29 01 7C
438E:F0 03 4C 31 EA 4C BC FE EB
4396:EA A2 00 86 AE E8 BD 20 58
439E:C1 F0 02 E6 AE E8 E0 10 DB
43A6:D0 F4 A5 AE D0 01 60 4C 0A
43AE:8A CA 00 00 00 00 00 00 2D
43B6:00 00 00 00 00 00 00 00 3D
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Easy Disk LOAD And SAVE

Article on page 75.

```
AR 10 POKE56,PEEK(56)-1:CLR:H=
      PEEK(56):L=PEEK(55):SA=H
      *256+L
GR 20 FORI=SATOSA+214:READA:PO
      KEI,A:X=X+A:NEXT
XM 30 IFX<>27368THENPRINT"DATA
       STATEMENT ERROR.":STOP
CR 40 LV=SA+24:LH=INT(LV/256):
      LL=LV-LH*256:POKESA+1,LL
      :POKESA+6,LH
MA 50 SV=SA+141:SH=INT(SV/256)
      :SL=SV-SH*256:POKESA+11,
      SL:POKESA+16,SH
CJ 60 PRINT"{CLR}SYS"SA"TO ACT
      IVATE."
EC 70 DATA 169,24,141,48,3,169
      ,192,141,49,3
XD 80 DATA 169,141,141,50,3,16
      9,192,141,51,3
BC 90 DATA 96,76,51,245,133,14
      7,169,0,133,144
JJ 100 DATA 165,186,208,3,76,1
       9,247,201,3,240
DJ 110 DATA 249,144,234,164,18
       3,208,3,76,16,247
RS 120 DATA 166,185,32,175,245
       ,169,96,133,185,32
RX 130 DATA 213,243,165,186,32
       ,9,237,165,185,32
BS 140 DATA 199,237,32,19,238,
       133,174,133,2,165
DQ 150 DATA 144,74,74,176,127,
       32,19,238,133,175
GA 160 DATA 133,3,224,3,208,16
       ,104,104,32,229
DP 170 DATA 244,165,2,133,20,1
       65,3,133,21,76
QX 180 DATA 48,225,224,2,208,2
       2,104,104,162,0
RA 190 DATA 32,229,244,134,45,
       132,46,169,0,32
DQ 200 DATA 144,255,32,51,165,
       76,89,166,76,229
QK 210 DATA 244,165,186,208,3,
       76,19,247,201,3
BH 220 DATA 240,57,144,52,165,
       185,201,1,208,13
QK 230 DATA 32,250,245,32,215,
       170,169,1,133,10
SQ 240 DATA 76,111,225,201,2,2
       08,26,32,253,174
PJ 250 DATA 32,138,173,32,247,
       183,132,193,133,194
HP 260 DATA 32,253,174,32,138,
       173,32,247,183,?132
EK 270 DATA 174,133,175,76,250
       ,245,76,89,246,76
BR 280 DATA 241,245,76,48,245
```

Improvisor

Article on page 46.

```
RG 10 NT=0:FORT=0TO9:READCO(T)
      ,CH(T):NEXT
XX 20 DATA 1,18,8,6,4,7,2,1,14
      ,3,5,4,12,6,9,7,5,1,6,3
JP 30 POKE53280,6:POKE53281,15
FD 40 PRINT"{CLR}{DOWN}{BLK}",
      "{BLU}THE GRAND IMPROVIS
      OR":PRINT"{DOWN}{RED}","
      {3 SPACES}{RVS} SHORT-TU
      NES "
SA 50 PRINT"{RED}{DOWN}
      {2 SPACES}TYPE {RVS}F1
      {OFF} KEY, AND C-64 GOES
       RANDOM.":REM FLAG=0 AND
       RA=1
SD 60 PRINT"[43{DOWN}
      {2 SPACES}TYPE {RVS}F3
      {OFF} KEY, AND C-64 WILL
       COMPOSE.":REM IF TUNE=0
RH 70 PRINT"{BLU}{DOWN}
      {2 SPACES}TYPE {RVS}F5
      {OFF} KEY, AND YOU CAN P
      LAY ALONG.":FLAG=0:REM A
      ND TUNE=0
ED 80 PRINT"[13{DOWN}
      {2 SPACES}TYPE {RVS}F7
      {OFF} KEY, AND YOU WILL
      {SPACE}HEAR TUNES.":TUNE
      =1:PRINT:REM FLAG=0
DX 90 PRINT"[73{DOWN} THESE AR
      E THE TUNES WHICH I MEMO
      RIZED."
JA 100 DATA 144,31,5,28,144,31
       ,156,144,31,30,5,28,156
       ,31,30,5
DC 110 DIMH1(32),L1(32),H2(32)
       ,L2(32),IN(16),TUNES(51
       2)
```

```
GQ 120 PRINT"{DOWN}{4}":GOTO33
       0
AK 130 REM ARRAY VALUES FOR AC
       COMPANIMENT TO THE IMPR
       OVISATIONS
MH 140 DATA0,0,0,0,5,152,11,48
       ,14,24,22,96,4,48,8,97,
       14,25,22,96
SS 150 DATA5,152,11,48,14,24,2
       2,96,4,48,8,97,4,112,8,
       225
HF 160 DATA4,180,9,104,15,210,
       22,96,3,35,6,71,15,210,
       22,96
PB 170 DATA4,180,9,104,15,210,
       22,96,3,35,6,71,3,244,7
       ,233
DP 180 DATA4,48,8,97,14,239,21
       ,31,3,35,6,71,14,239,21
       ,31
CC 190 DATA4,48,8,97,14,239,21
       ,31,3,35,6,71,3,187,7,1
       19
CP 200 DATA4,48,16,195,4,180,1
       4,239,4,251,14,24,5,71,
       12,143
KJ 210 DATA5,152,11,48,4,48,14
       ,24,5,152,11,48,0,0,0,0
XE 220 REM A SHORT ROUTINE TO
       {SPACE}GIVE THE C-64 A
       {SPACE}LITTLE A.I. IN M
       USIC COMPOSITION
EJ 230 AI=INT(RND(0)*23)+1:NE=
       131
DB 240 IFAI>16THENON(AI-16)GOT
       O260,270,280,290,300,31
       0,320
RC 250 R=TU((AI*16)+P):RETURN
AA 260 R=0:RETURN
JC 270 R=2:RETURN
SF 280 R=3:RETURN
GE 290 R=5:RETURN
KH 300 R=7:RETURN
XG 310 R=8:RETURN
PE 320 R=0:RETURN
SA 330 PRINT"{HOME}{20 DOWN}
       {2 RIGHT}{7}{RVS} I AM
       {SPACE}MEMORIZING SIXTE
       EN TUNES NOW. "
HC 340 FORK=1TO16:READIN(K):NE
       XT
PC 350 FORI=0TO32:READH1(I),L1
       (I),H2(I),L2(I):NEXTI
QQ 360 FORT=0TO9:READH3(T),L3(
       T):NEXTT
MJ 370 FORTN=1TO512:READTUNES(
       TN):NEXT:TUNE=1
EP 380 FORS=1TO20:POKE1823+S,3
       2:POKE1863-S,32:FORD=1T
       033:NEXTD:NEXTS
DR 390 L1=54272:L2=54279:L3=54
       286
QE 400 H1=L1+1:H2=L2+1:H3=L3+1
JX 410 V1=L1+4:V2=L2+4:V3=L3+4
HG 420 POKE54296,12:CH=1874:CO
       =56146
QM 430 POKEV1+1,10:POKEV1+2,70
FH 440 POKEV2+1,10:POKEV2+2,70
KP 450 POKEV3+1,10:POKEV3+2,75
       :POKEV3-1,8
HM 460 P=1:REM PLAY ACCOMPANIM
       ENT AND GET MELODY NOTE
       FROM MELODY ARRAY
GE 470 Q=Q+1:IFQ=17THENFORT=1T
       O1111:NEXT:POKE53281,7:
       GOTO930
EA 480 PRINT"{HOME}{23 DOWN}
       {BLK}{10 SPACES}0 1 2 3
       4 5 6 7 8 9 "
BP 490 PRINT"{HOME}{19 DOWN}"
CK 500 PRINT"{7}"SPC(7)"{RVS}
       {SPACE}NOW PLAYING IMPR
       OV."CHR$(IN(Q))"{RVS} #
       ";Q;"{LEFT} "
XH 510 POKEV1,32:POKEV2,32:POK
       EV3,64:NT=NT+1
DE 520 GETA$:NE=150:IFA$=""THE
       NA$="5"
XM 530 IFA$="{F7}"THENFLAG=0:T
       UNE=1:RA=0:PRINT"{HOME}
       {3 DOWN}{13}","
       {3 SPACES}{RVS} SHORT-T
       UNES{2 SPACES}":GOSUB92
       0
HM 540 IFA$="{F5}"THENFLAG=0:T
       UNE=0:RA=0:PRINT"{HOME}
       {3 DOWN}{BLU}","
       {2 SPACES}{RVS} NOW YOU
        PLAY. ":GOSUB910
EA 550 IFA$="{F3}"THENFLAG=1:T
       UNE=0:RA=0:PRINT"{HOME}
       {3 DOWN}{4}","
       {2 SPACES}{RVS} C-64 CO
       MPOSES.":GOSUB900
GQ 560 IFA$="{F1}"THENFLAG=0:T
       UNE=0:RA=1:PRINT"{HOME}
       {3 DOWN}{RED}","
       {2 SPACES}{RVS} C-64
       {2 SPACES}RANDOM. ":GOS
       UB890
DC 570 R=VAL(A$):IFFLAGTHENGOS
       UB230
JB 580 IFRATHENR=INT(RND(1)*10
       )
MH 590 IFTUNETHENR=TUNES(NT)
PD 600 IFR>9THENR=0
XK 610 POKEH1,H1(P):POKEL1,L1(
       P):POKEH2,H2(P):POKEL2,
       L2(P)
AJ 620 IFP=31THENR=1
XJ 630 IFP=32THENR=0
PM 640 IFH3(R)=0GOTO660
JB 650 POKEH3,H3(R):POKEL3,L3(
       R):POKEV3,65
KF 660 POKEV1,33:POKEV2,33:POK
       ECH+40+(R*2),CH(R):POKE
       CO+40+(R*2),CO(R)
BQ 670 FORT=1TONE:NEXT
PR 680 POKECH+40+(R*2),32:P=P+
       1:IFP=33THENP=1:GOTO470
MR 690 A$="":GOTO510
XH 700 DATA0,0,22,96,25,30,28,
       49,33,135,37,162,44,193
       ,50,60,56,99,67,15
JP 710 REM EACH LINE OF DATA C
       ONTAINS THE NOTES FOR O
       NE LITTLE IMPROV.--16 D
       IFF.
PJ 720 DATA4,4,0,5,6,7,8,0,7,7
       ,0,8,7,6,5,0,4,4,0,2,4,
       7,9,0,9,8,7,4,6,0,1,0
RE 730 DATA4,5,6,5,4,5,6,5,7,8
       ,7,8,7,0,0,8,7,8,9,8,7,
       8,9,8,6,7,6,5,6,0,1,0
BM 740 DATA4,4,5,4,8,8,7,6,7,8
       ,7,6,5,0,6,5,4,9,7,9,4,
       9,7,0,9,9,4,4,6,0,1,0
XH 750 DATA1,2,3,4,1,2,3,0,7,6
       ,5,0,7,6,5,0,4,4,9,9,4,
       4,7,0,9,8,7,8,6,4,1,0
GK 760 DATA4,4,3,5,4,0,3,0,7,7
       ,6,5,7,0,5,0,4,4,2,3,4,
       4,4,0,9,9,8,7,8,6,1,0
SS 770 DATA4,4,8,6,4,4,8,6,7,7
       ,6,5,7,8,7,0,4,4,9,0,9,
       9,4,0,7,4,5,4,3,1,1,0
XG 780 DATA1,2,3,4,5,6,7,8,7,0
       ,5,0,7,6,5,0,4,9,7,9,4,
       0,7,0,9,7,4,5,6,0,1,0
AX 790 DATA3,3,3,0,3,3,3,0,2,2
       ,2,3,2,0,5,0,4,4,4,0,9,
       9,9,0,4,9,4,9,6,4,1,0
SB 800 DATA3,4,5,3,4,5,4,3,2,3
       ,2,7,2,0,5,0,4,9,4,7,9,
       7,4,0,9,8,7,5,6,0,1,0
JB 810 DATA4,4,5,4,8,8,7,6,7,7
       ,5,5,7,0,6,5,4,2,4,5,4,
       2,4,0,9,4,5,4,3,1,1,0
SE 820 DATA3,0,3,2,1,0,1,0,2,3
       ,2,5,2,3,2,0,4,4,4,9,4,
       4,4,0,9,8,7,4,6,6,1,0
JC 830 DATA8,9,9,0,8,7,6,0,7,8
       ,9,8,7,0,5,0,4,4,5,4,9,
       0,4,0,7,6,5,4,6,4,1,0
AB 840 DATA5,5,4,0,5,5,4,0,3,3
       ,2,0,3,3,2,0,4,4,7,0,4,
       4,9,0,4,4,5,4,3,1,1,0
HC 850 DATA1,3,4,5,6,5,4,3,2,3
       ,2,0,7,8,7,0,4,5,4,9,4,
       5,4,0,8,7,6,5,6,0,1,0
HP 860 DATA9,8,7,6,5,4,3,4,2,3
       ,4,5,7,6,5,0,9,4,4,5,4,
       9,4,0,9,8,7,4,6,6,1,0
BH 870 DATA4,5,4,6,4,5,4,0,2,3
       ,2,5,2,3,2,0,4,5,4,7,4,
       4,4,0,9,8,7,4,5,6,1,0
JR 880 REM INSTRUCTIONS FOR EA
       CH FUNCTION
GE 890 PRINT"{HOME}{14 DOWN}
       {RED} NOTE SEQUENCES US
       ING A RANDOM FUNCTION."
       :RETURN
MK 900 PRINT"{HOME}{14 DOWN}
       {4} THE C-64'S A. I. IN
        MUSIC COMPOSITION. ":R
       ETURN
MX 910 PRINT"{HOME}{14 DOWN}
       {BLU} NUMBERS FOR NOTES
        - LETTERS FOR RESTS. "
       :RETURN
BP 920 PRINT"{HOME}{14 DOWN}
       {7} THESE ARE THE TUNES
        WHICH I MEMORIZED. ":R
       ETURN
HE 930 PRINT"{CLR}{BLU}
       {4 RIGHT}THAT'S ALL THE
        GRAND IMPROVISOR"
SK 940 PRINT"{11 RIGHT}WILL PL
       AY FOR NOW."
```

Power BASIC:

Countdown Timer

Article on page 82.

Program 1: Countdown Timer—64 Version

```
QD 10 FORI=679TO733:READA:X=X+
      A:POKEI,A:NEXT
CG 20 IFX<>7836THENPRINT"DATA
      {SPACE}STATEMENT ERROR."
      :STOP
AQ 30 DATA 120,169,180,141,20,
      3,169,2,141,21
HP 40 DATA 3,88,96,198,162,165
      ,162,201,255,208
XS 50 DATA 28,198,161,165,161,
      201,255,208,20,198
PD 60 DATA 160,165,160,201,255
      ,208,12,169,79,133
KH 70 DATA 160,169,25,133,161,
      169,255,133,162,3?2
FQ 80 DATA 188,246,76,52,234
```

Program 2: Countdown Timer—128 Version

```
QK 10 FORI=3072TO3135:READA:PO
      KEI,A:X=X+A:NEXT
AB 20 IFX<>8696THENPRINT"DATA
      {SPACE}STATEMENT ERROR."
      :STOP
```

```
JJ 30 DATA 120,169,13,141,20,3
      ,169,12,141,21
PG 40 DATA 3,88,96,216,32,36,1
      92,176,3,76
PH 50 DATA 125,250,198,162,165
      ,162,201,255,208,28
XJ 60 DATA 198,161,165,161,201
      ,255,208,20,198,160
CK 70 DATA 165,160,201,255,208
      ,12,169,79,133,160
FS 80 DATA 169,25,133,161,169,
      255,133,162,32,25
QH 90 DATA 246,76,110,250
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

The Versatile CIRCLE

Article on page 68.

The Versatile Circle—Program 1

```
SX 10 SU=.1:CX=160:CY=100:AS=1
      .4:C=1
SM 20 COLOR 0,12:COLOR 4,14:CO
      LOR 5,14:GRAPHIC 0,1
AQ 30 INPUT"NO. OF SIDES (3,4
      {SPACE}OR 6) OR 0 TO QUI
      T";NS
EF 40 IF NS=0 THEN GRAPHIC CLR
      :END
GH 50 IF NS<>3 AND NS<>4 AND N
      S<>6 THEN 30
GX 70 YR=90:XR=AS*YR:SA=180/NS
      :EA=SA+360
DR 100 COLOR 0,7:COLOR 1,15:CO
       LOR 4,7:GRAPHIC 1,1
DA 130 CIRCLE C,CX,CY,XR,YR,SA
       ,EA,0,360/NS
FX 160 GETKEY A$:GOTO 20
```

The Versatile Circle—Program 2

```
SX 10 SU=.1:CX=160:CY=100:AS=1
      .4:C=1
SM 20 COLOR 0,12:COLOR 4,14:CO
      LOR 5,14:GRAPHIC 0,1
AQ 30 INPUT"NO. OF SIDES (3,4
      {SPACE}OR 6) OR 0 TO QUI
      T";NS
EF 40 IF NS=0 THEN GRAPHIC CLR
      :END
GH 50 IF NS<>3 AND NS<>4 AND N
      S<>6 THEN 30
GX 70 YR=90:XR=AS*YR:SA=180/NS
      :EA=SA+360
DK 80 H=↑/NS:S=SIN(H):T=TAN(H)
      :RF=SQR(4*S*S*SU*(SU-1)+
      1)
PQ 90 DA=ATN(2*SU*T/((1-2*SU)*
      T*T+1))*180/↑
DR 100 COLOR 0,7:COLOR 1,15:CO
       LOR 4,7:GRAPHIC 1,1
EG 110 FOR NR=1 TO 20:EA=SA+36
       0
DA 130 CIRCLE C,CX,CY,XR,YR,SA
       ,EA,0,360/NS
HR 150 YR=RF*YR:XR=AS*YR:SA=IN
       T(SA+DA+.5):NEXT
FX 160 GETKEY A$:GOTO 20
```

The Versatile Circle—Program 3

```
RJ 10 SU=.1:CX=80:CY=100:AS=.7
SM 20 COLOR 0,12:COLOR 4,14:CO
      LOR 5,14:GRAPHIC 0,1
AQ 30 INPUT"NO. OF SIDES (3,4
      {SPACE}OR 6) OR 0 TO QUI
      T";NS
EF 40 IF NS=0 THEN GRAPHIC CLR
      :END
GH 50 IF NS<>3 AND NS<>4 AND N
      S<>6 THEN 30
PJ 60 B=4:IF NS=4 THEN B=3
GX 70 YR=90:XR=AS*YR:SA=180/NS
      :EA=SA+360
DK 80 H=↑/NS:S=SIN(H):T=TAN(H)
      :RF=SQR(4*S*S*SU*(SU-1)+
      1)
PQ 90 DA=ATN(2*SU*T/((1-2*SU)*
      T*T+1))*180/↑
BC 100 COLOR 0,2:COLOR 1,3:COL
       OR 2,6:COLOR 3,7:COLOR
       {SPACE}4,2:GRAPHIC 3,1
EG 110 FOR NR=1 TO 20:EA=SA+36
       0
HM 120 C=0:FOR W=1 TO NS:EA=SA
       +360/NS:C=C+1:IF C=B TH
       EN C=1
DA 130 CIRCLE C,CX,CY,XR,YR,SA
       ,EA,0,360/NS
AG 140 SA=SA+360/NS:NEXT
HR 150 YR=RF*YR:XR=AS*YR:SA=IN
       T(SA+DA+.5):NEXT
FX 160 GETKEY A$:GOTO 20
```

The Versatile Circle—Program 4

```
BJ 10 COLOR 0,12:COLOR 4,14:CO
      LOR 5,14:GRAPHIC 0,1:AS=
      .7
CR 20 PRINT"{5 DOWN}";SPC(14);
      "T - TRIANGLES":PRINT
XF 30 PRINT SPC(14);"S - SQUAR
      ES":PRINT
CH 40 PRINT SPC(14);"H - HEXAG
      ONS":PRINT
KB 50 PRINT SPC(14);"Q - QUIT"
      :PRINT:PRINT
XQ 60 PRINT:PRINT SPC(11);"PRE
      SS T, S, H, OR Q";
XJ 70 GETKEY A$:IF A$<>"T" AND
       A$<>"S" AND A$<>"H" AND
       A$<>"Q" THEN 60
RR 80 IF A$="Q" THEN SCNCLR 0:
      GRAPHIC CLR:END
AC 90 COLOR 0,1:COLOR 1,7:COLO
      R 2,5:COLOR 3,4:COLOR 4,
      1:GRAPHIC 3,1
JP 100 IF A$="S" THEN 290
GB 110 IF A$="H" THEN 390
RC 120 SU=.1:II=1:RF=SQR(1-3*S
       U+3*SU*SU)
KJ 130 DA=ATN(SQR(3)*SU/(2-3*S
       U))*180/↑
CD 140 C=1:FOR J=0 TO 3:II=-II
       :JJ=1:C=J+1:IF C=4 THEN
        C=1
RA 150 P=C+1:IF P=4 THEN P=0
PS 160 FOR I=0 TO 6:JJ=-JJ:IF
       {SPACE}I<J OR I>6-J THE
       N 270
FF 170 YR=32:XR=AS*YR:CX=23+19
       *I:CY=180-48*J-(I AND 1
       )*16+(J AND 1)*JJ*16
KK 180 C=C+1:IF C=4 THEN C=1
JX 190 P=P+1:IF P=4 THEN P=1
XE 200 IF II=JJ THEN A=0:R=1:W
       =C
FM 210 IF II<>JJ THEN A=180:R=
       -1:W=P
RQ 220 IF I=3 AND J=2 THEN W=3
JF 230 FOR NR=1 TO 11:FOR S=1
       {SPACE}TO 3:IF II=JJ TH
       EN W=W+1:IF W=4 THEN W=
       1
EH 240 IF II<>JJ THEN W=W-1:IF
        W=0 THEN W=3
FJ 250 CIRCLE W,CX,CY,XR,YR,A,
       A+120,,120:A=A+120:NEXT
        S
CQ 260 YR=RF*YR:XR=AS*YR:A=360
       +A+R*DA:NEXT NR
QS 270 NEXT I,J
JG 280 GETKEY A$:GOTO 10
KA 290 SU=.12:RF=SQR(1-2*SU+2*
       SU*SU)
EG 300 DA=ATN(SU/(1-SU))*180/↑
       :C=1
QH 310 FOR I=0 TO 3:C=C+1:IF C
       =3 THEN C=1
SM 320 FOR J=0 TO 3:IF C=1 THE
       N C=2:ELSE C=1
AG 330 YR=31.82:XR=AS*YR:CX=35
       +30*I:CY=166-44*J
PP 340 A=45:R=1:IF (I AND 1)=(
       J AND 1) THEN A=135:R=-
       1
EK 350 FOR NR=1 TO 15:FOR S=1
       {SPACE}TO 4:C=C+1:IF C=
       3 THEN C=1
AC 360 CIRCLE C,CX,CY,XR,YR,A,
       A+90,,90:A=A+90:NEXT S
QM 370 YR=RF*YR:XR=AS*YR:A=360
       +A+R*DA:NEXT NR,J,I
HJ 380 GETKEY A$:GOTO 10
AS 390 SU=.2:RF=SQR(1-SU+SU*SU
       )
GB 400 DA=ATN(SQR(3)*SU/(2-SU)
       )*180/↑
BM 410 FOR J=0 TO 2:FOR I=0 TO
        2:IF J=0 AND I<>1 THEN
       470
JQ 420 E=4:IF I=1 THEN E=31
FB 430 YR=31:XR=AS*YR:CX=47+32
       *I:CY=186-54*J-E:A=30:C
       =0
JC 440 FOR NR=1 TO 20:FOR S=1
       {SPACE}TO 6:C=C+1:IF C=
       4 THEN C=1
BF 450 CIRCLE C,CX,CY,XR,YR,A,
       A+60,,60:A=A+60:NEXT S
SX 460 YR=RF*YR:XR=AS*YR:A=A+D
       A:NEXT NR
RP 470 NEXT I,J
BC 480 GETKEY A$:GOTO 10
```

COMPUTE!'s GAZETTE
TOLL FREE
Subscription
Order Line
1-800-247-5470
In IA
1-800-532-1272

YOUR COMMODORE CONNECTION

NEW AMIGA SYSTEM PACKAGES

New Amiga systems are being introduced. Call for pricing on Amiga 500 and Amiga 200 system packages.

COMMODORE 128 SYSTEM

INCLUDES: CB128 Computer, CB1571 Disk Drive, Magnavox 515 RGB/Composite Monitor. **$759.00**

COMMODORE 64 System Package

INCLUDES: CB64C Computer, CB1541C Disk Drive, CB1802C Monitor

ENTIRE SYSTEM $539.00

DRIVES

CBM1541C	$199.00
CBM1571	$249.00
CSI 10Mb (64-128)	$1199.00
INDUS-GT (64/128)	$189.00
MICROBOTICS 20Mb.	$1299.00

MODEMS

Anchor Volksmodem	$59.99
Anchor Omega 80	$129.00
Anchor 6480 (64/128) 300/1200 Baud	$119.00
CBM 1660 (C-64)	$59.99
CBM 1670 (C-128)	$99.99

MONITORS

RGB/COLOR

Magnavox 515	$289.00
Amiga 1080 Hi-Res	$269.00
Magnavox 643 14''	$419.00
Commodore 1802C	$199.00

PRINTERS

EPSON Homewriter 10	$99.99
PANASONIC KX-P1080i	$219.00
OKIDATA 182	$219.00
STAR SL10C	$199.00
CITIZEN MSP-10	$299.00

DISKETTES

Maxell SS/DD 5¼(10)	$8.99
Maxell SS/DD 3½(10)	$12.99
Sony SS/SD 5¼(10)	$8.49
Sony DS/DD 3½(10)	$14.49
GENERIC DS/DD w/Flip'n File	
10 Disk Holder	$11.99

ACCESSORIES

CompuGuard Surge and Spike Protector	$14.99
Curtis SP2 Surge and Spike Protector	$39.99
Curtis Safe Strip with 6 Outlets	$19.99
Curtis Universal Printer Stand	$14.99
Computer Specialties Power Plus	$54.99
Flip'N File 3½''(25) 5¼''(50) Disk Storage	$9.99
CB128 Universal Monitor Cable	$16.99

INTERFACES

Orange Micro Grappler ..	$89.99
PPI Printer Interface	$34.99
Xetec 8K	$69.99
Micro R & D MJ350	$44.99

SOFTWARE FOR 64/128

ATARISOFT/Commodore

Centipede	$4.99
Donkey Kong	$4.99

BRODERBUND

The Print Shop	$29.99
Graphics Library 1,2,3 ea.	$17.99
Bank Street Writer	$34.99
Print Shop Companion	$24.99
The Toy Shop	$39.99

COMMODORE

Jane-integrated (128)	$39.99
Geos for 64, 64C, 128	$49.99
Assembler 64	$9.99
Pilot 64	$9.99
Screen Editor	$9.99
Pet Emulator	$9.99
Super Expander ROM	$9.99

DATA SOFT

Genesis	$5.99
Dallas Quest	$5.99

HES

Benji Space Rescue	$3.99
HES Games/Olympics	$3.99

Professional Software

Fleet Systems II C128/64	$49.99
Fleet Systems III C128	$49.99
Trivia Fever	$19.99

PFS

File	$29.99

SPRINGBOARD

The News Room	$32.99
Clip Arts	$19.99
Clip Arts II	$27.99

SUBLOGIC

Flight Simulator II	$37.99
Jet Simulator C64	$37.99

SPINNAKER

Rhymes & Riddles	$7.99
Alf Cocor Caves	$7.99
Bubble Burst	$7.99
Trains	$7.99

SOFTWARE FOR AMIGA

ACTIVISION

Borrowed Time	$32.99
Hacker	$32.99
Mind Shadow	$32.99

AEGIS DEVELOPMENT

Animation/Images	$99.99

COMMODORE

Textcraft w/Graphic Craft	$59.99
Musicraft	$79.99
TLC Logo	$79.99
Amiga Pascal	$79.99
Lattice ''C''	$119.00
Assembler	$79.99
Lisp	$156.00
Mindwalker	$39.99
Enhancer 1.2 DOS	$14.99
Terminal Emulator	$39.99

MICRO SYSTEMS

Scribble	$79.99
On-Line/Comm	$49.99
Organize Data Base	$69.99
Analyze Version 2.0	$119.00

SUBLOGIC

Flight Simulator II	$37.99

V.I.P.

V.I.P. Professional	$139.00

DISCOVER SOFTWARE

Marauder II Back-up	$32.99

ELECTRONIC ARTS

Deluxe Paint	$69.99
Archon	$31.99
One on One	$31.99
Sky Fox	$31.99
Financial Cookbook	$37.99
Seven Cities of Gold	$31.99
Arctic Fox	$31.99
Deluxe Print	$74.99
Instant Music	$34.99
Deluxe Video	$69.99

INFOCOM

Wishbringer	$31.99
Hitchhiker's Guide	$31.99
Spellbreaker	$31.99
Planetfall	$31.99
Witness	$31.99

MICRO ILLUSIONS

Dynamic-Cad	$349.00

MINDSCAPE

Halley Project	$31.99
Deja Vu	$34.99
Keyboard Cadet	$29.99

When you want to talk computers. When you want to talk price.

U.S.A. and Canada

Call toll-free: 1-800-233-8950

Outside the U.S.A. & Canada 717-327-9575 Telex 5106017898

Educational, Governmental and Corporate Organizations

call toll-free 1-800-221-4283

CMO. 477 East Third Street, Dept. A404, Williamsport, PA 17701

All major credit cards accepted.

POLICY: Add 3% (minimum $7.00) shipping and handling. Larger shipments may require additional charges. Personal and company checks require 3 weeks to clear. For faster delivery use your credit card or send cashier's check or bank money order. Pennsylvania residents add 6% sales tax. All prices are subject to change and all items are subject to availability. Defective software will be replaced with the same item only. Hardware will be repaired or replaced at our discretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to a restocking fee.

COMPUTER MAIL ORDER

Who You Gonna Call? Triad Computers, That's Who!

We're the first company to offer fast, expert Commodore service anywhere in the USA. And we're still the best!

For one low price, we repair all problems on most types of Commodore equipment. We feature repairs with a full-year warranty for far less than you'd expect. For preventative maintenance, we also offer a 1-year service contract at tremendous savings! Check our low prices!

	Repair	Repair with 1-Year Warranty	1-Year Service Contract
C-64 Computer	$ 59.00	$ 89.00	$ 69.00
C-128 Computer	89.00	119.00	99.00
1541 Drive Logic repair	69.00	99.00	79.00
1571 Drive Logic repair	79.00	109.00	89.00
1541 or 1571 Permanent Fix (Alignment and modification to stay in alignment!)	69.00	99.00	79.00
1702, 1802, 1902 Monitor	79.00	109.00	89.00
1541 or 1571 alignment (only)	Just 29.95		

And as an extra benefit — our repair customers are eligible for big discounts on software and hardware purchases.

FREE PERMANENT FIX

A $69.00 value — includes alignment and modification to stay in alignment. FREE with any 1541 or 1571 one year warranty repair.

For fast, expert service . . . Just call our toll free number today!

1-800-624-6794

(For your convenience, have your equipment serial number and credit number ready. Checks and money orders also accepted). Add $7.50 for shipping — includes two-day air service anywhere in the Continental USA. For APO-FPO and P.O. Box addresses, add $15.00 for shipping (excluding air freight).

TRIAD COMPUTERS

3402-E W. Wendover
Greensboro, NC 27407
1-800-624-6794 or (919) 299-0391

CHOICE MasterCard VISA

COMPUTER CENTERS OF AMERICA'S

SPRING

FOR ORDERS ONLY OUT OF STATE CALL
1-800-631-1003

IN N.Y. STATE CALL TOLL FREE
1-800-221-2760

WYSE

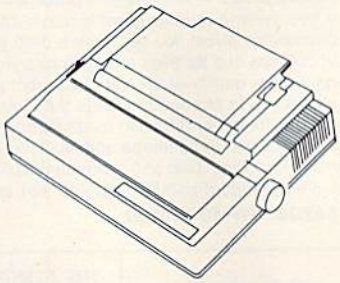
WY 1400-01
■ 256K RAM STD, EXPANDABLE TO 640K ■ ONE 360K HALF-HEIGHT DISK DRIVE ■ 9.54 MHZ, 8088-1 PROCESSOR WITH SOCKET PROVIDED FOR 9.54 MHZ 8087-1 ■ 4.77 MHZ COMPATIBILITY MODE ■ MS DOS 3.1 WITH GW BASIC
$899.99

WY 1400-02
DUAL DISKETTE DRIVE. SAME AS WY 1400-01, WITH ADDITION OF A SECOND HALF-HEIGHT, 360K DRIVE, 640K RAM ON MAIN PROCESSOR BOARD.
$999.99

WY 1400-20
WITH ONE 20MB HARD DRIVE. SAME AS WY 1400-02 WITH ADDITION OF A HALF-HEIGHT 20MB HARD DISK DRIVE.
$1399.99

STAR MICRONICS PRINTER SALE

NX10 PRINTER
☐ 120 CPS Dot Matrix
☐ 5K Buffer



$179.95*

*Only one per customer with purchase of two ribbons while supplies last.

star micronics

ND-15
☐ 180 CPS
☐ NLQ, 45 CPS
$429.95

NP-10
☐ 100 CPS
☐ NLQ, 25 CPS
$169.95

NX10C
Commodore 120 CPS Dot Matrix
$205.00

commodore 64 PACKAGE

64C INCLUDES:
- Commodore 64 Computer
- Commodore 1541 Disc Drive
- A Color Monitor with Cables

CALL FOR PRICE

SP-1000

- Built-in Commodore Interface
- 2-Year Warranty
- Near Letter Quality Mode

SEIKOSHA
$149*

*With purchase of two ribbons.

star micronics

STARS SALE OF THE YEAR

SD10 160 CPS Dot Matrix Printer	$250.00*
SD15 160 CPS 15" Dot Matrix Printer	$350.00*
SR10 200 CPS Dot Matrix Printer	$365.00*
SR15 200 CPS 15" Dot Matrix Printer	$450.00*
SB10 24 Pin Dot Matrix Printer	$299.00*
Powertype 18 CPS Daisywheel Printer	$199.00*
SG10C 120 CPS Commodore Printer	$179.00*

*Limited supply with purchase of two ribbons.

commodore 128 PERSONAL COMPUTER

$249.95*

commodore 1571 DISC DRIVE

$229.95*

NEW SEIKOSHA PRINTERS.

SP180
■ BUILT-IN COMMODORE INTERFACE
■ 100 CPS 20 NLQ
■ 2 YR WARRANTY
$159.95

SP1200 AI PARALLEL PRINTER
■ FOR COMMODORE & IBM
■ 120 CPS WITH 5K BUFFER
■ 35 CPS NEAR LETTER QUALITY
$199.95

commodore 64C INCLUDES

• GEOS/SOFTWARE FREE IN BOX
$169.95*

commodore 1541C

$179.95*

FOR ORDERS ONLY
IN N.Y. STATE CALL TOLL FREE
1-800-221-2760
OUT OF STATE CALL
1-800-631-1003
FOR ALL OTHER INFO **516-349-1020**

COMPUTER CENTERS OF AMERICA
81 TERMINAL DRIVE
PLAINVIEW, NY 11803

Check, Money Order, MC or VISA accepted. No additional charge for MasterCard and Visa. Call for shipping and handling information / NYS residents add applicable sales tax / Prices and availability are subject to change without notice / All factory fresh merchandise with manufacturer's warranty. Dealers Welcome. Call for recent price reductions and new rebate information. Plus shipping and handling. No returns without return authorization number.

Sensational Prices!
. . . On Our Most Popular Items!

from microPal® . . .

THE 49¢ DISKETTE!

Are you paying too much for diskettes? Try our first quality, prime, 5¼" diskettes (no rejects, no seconds) at these fantastic sale prices and save, save, SAVE! Disks are packaged in boxes of 50; including diskettes in sleeves, labels, and write-protect tabs.

Each diskette is certified to be 100% error free and comes with a lifetime warranty (if you have a problem, we'll replace the diskette). All diskettes include hub reinforcement rings and write-protect notch.

All diskettes are double density and work in either single or double density drives.

SS, DD Diskettes, Box of 50
32391 **$24.50–49¢ ea.!**

DS, DD Diskettes, Box of 50
32403 **$29.50–59¢ ea.!**

Lowest Cost, Best Performing Star Printer Ever!!

NEW

star micronics inc.

NP-10. Ideal for school ***and*** home use, the newest printer in the Star line promises to be a best-seller due to its great features and unbeatable price! You get superb draft printing at 100 cps and its easy to switch to crisp, precise near letter quality at 25 cps. Easy front panel operation allows you to change modes at the simple touch of a button. Tractor and friction feeds standard. Printing is bidirectional in draft mode and unidirectional in bit image and NLQ modes. Five character sets are available in draft mode including italic and international characters, with three sets available in NLQ. 2K buffer. Standard parallel interface. Full one-year warranty. Sug. Retail $279.00

64204 NP-10 Printer **$CALL FOR LOWEST PRICE!**

★ THE BEST PRICES ★
★ THE BEST SERVICE ★
WHY SHOP ANYWHERE ELSE?

THE FAMOUS SLIK STIK™ **ONLY $6.95!**

The Slik Stik™ has been a favorite for years . . . and for good reason. It's just the right combination of responsiveness and accuracy. And the price can't be beat! From Suncom. 90 day warranty. Connects directly to Commodore Computers.

42086 **$6.95**

POWER and PROTECTION FOR YOUR C-64!®

POW'R PAK 64

from MicroPal®

Pow'r Pak is a replacement power supply (1.5 amp) for the Commodore 64® . . . but that's not all! Pow'r Pak also supplies two additional surge protected outlets (120V) for monitor, disk drive, or other peripherals. On/off switch. Fuse protection. Sturdy all-metal casing is ventilated for heat dissipation. Full 1 year warranty.

34910 **$49.95**

Space Saving Printer Stand

NEW LOW PRICES!

At last a printer stand priced for homes and small offices! This great stand from Suncom is elevated so you can place your paper underneath. Features heavy duty welded steel wire construction and has a vinyl coating to reduce noise and vibration. Another plus . . . the printer is held at an angle that makes it much easier to see your output as it is being printed. Available in two widths: 12" for most 80 column printers, and 18" for most 132 column printers.

33232 12" Printer Stand . . . . . (Was $14.95) **ONLY $ 6.95**
33246 18" Printer Stand . . . . . (Was $22.95) **ONLY $12.95**

Paper Tray

Ever wondered what to do with the printout that comes out of the printer and tends to spill all over the table and floor? The Suncom Paper Tray attaches to the rear of all Suncom stands and receives the printed paper as it comes out of the printer. Helps to neatly fold and stack it! Sug. Retail $14.95

42091 . . . . . **$11.95**

Our Lowest Price Ever On Diskette Storage!

ONLY $4.95

INNOVATIVE CONCEPTS, INC.

FLIP SORT 70

- Stores and files up to 70 5¼" diskettes.
- Includes 5 index dividers for organization of filing and retrieval.
- Molded from highly durable plastic.

Sug. Retail $7.95
Regular Tenex Price $6.95
43375 **SUPER SALE $4.95**

DUST COVER and "EVERYTHING BOOK" SPECIAL OFFER

Get to know us by ordering this great dust cover for your C-64 or C-128 and our catalog, "The Everything Book for the C-64 and C-128 Home Computers," for $2.95 (no extra shipping and handling charges). Cover is antistatic, translucent 8-gauge vinyl sewn to our exacting standards with reinforced seams. Discover the savings and easy shipping available from TENEX Computer Express!

$2.95

31627 C-64 Dust Cover and Catalog (G2A)
38464 C-128 Dust Cover and Catalog (G2A)

The Right Interface For All Your Printing Needs!!

PPI with graphics

". . . *a sound investment for your Commodore.*" RUN, *Dec. '85* This high-performance graphics parallel printer interface from DSI for C-64 and VIC-20 emulates a Commodore printer. Comes with cables and user's manual.

33565 . . . . . **$39.95**

Super Graphix. Features 8K buffer, 10 printing modes, 3 internal screen dumps and top mounted dip switches. Supports superscript, subscript, underlining, bold face, and a choice of 9 character widths. From Xetec.

41769 . . . . . **$69.95**

Super Graphix Jr. A more economical version of the Super Graphix, featuring graphics, normal and correspondence quality printing. Compatible with all major printers. From Xetec.

41774 . . . . . **$49.95**

From Your Friends At
TENEX Computer Express

We gladly accept mail orders!
P.O. Box 6578
South Bend, IN 46660

Questions? Call 219/259-7051

Ad G2A

SHIPPING CHARGES	
ORDER AMOUNT	CHARGE
less than $20.00	$3.75
$20.00–$39.99	4.75
$40.00–$74.99	5.75
$75.00–$149.99	6.75
$150.00–$299.99	7.75
$300 & up	8.75

Foreign Orders add $4.00. Heavy items ship at actual cost.

MasterCard VISA

NO EXTRA FEE FOR CHARGES
WE VERIFY CHARGE CARD ADDRESSES

ORDER TOLL FREE
1-800-348-2778
INDIANA ORDER LINE 1-800-225-6838

COMMODORE 64 is a registered trademark; and COMMODORE 128 is a trademark of Commodore Electronics, Ltd.

SAVINGS BONANZA

FOR ORDERS ONLY

1-800-631-1003 1-800-221-2760

NEW

brother.

PRINTERS.

FOR COMMODORE & Apple

M1009
- 9 PIN IMPACT DOT MATRIX
- 50 CPS PAR INT.
- OPT. TRACTOR INCLUDED

$129.95

M1409
- 9 PIN IMPACT DOT MATRIX
- 180 CPS PAR INT.
- BI DIRECTIONAL LOGIC SEEKING

$349.95

M1509
- 9 PIN IMPACT DOT MATRIX
- 180 CPS NLQ 45 DUAL PAR/SER.
- BI DIRECTIONAL LOGIC SEEKING
- PIN FEED PUSH TRACTOR

$369.95

M1709
- 9 PIN IMPACT DOT MATRIX
- 200 CPS NLQ 50 DUAL PAR/SER.
- BI DIRECTIONAL LOGIC SEEKING
- TRACT FEED INC.

$479.95

GEOS™
GRAPHIC ENVIRONMENT OPERATING SYSTEM

• 5 DIFFERENT FONTS • DESK TOP • GEO PAINT • GEO WRITE • DESK ACCESSORIES

NEW FONT - PACK
DESK - PACK
FOR THE COMMODORE 64

CALL FOR PRICE

Paperback Writer 128

Paperback Filer 128
Paperback Planner 128
YOUR CHOICE
$29.95
for the Commodore 128

NEW! NEW!

CANNON

PRINTERS

A-50
- 9 PIN SER IMPACT DOT MATRIX
- 180 CPS 34 NLQ
- IBM OR EPSON COMPATIBLE
- LOGIC SEEKING BI DIRECTIONAL SPECIAL

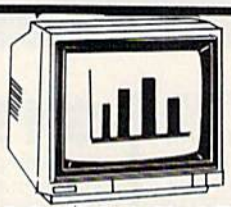
$269.95

A-55
- 9 PIN SER IMPACT DOT MATRIX
- 180 CPS 34 NLQ
- IBM EPSON COMPATIBLE
- 17" CARRIAGE
- LOGIC SEEKING, BI DIRECTIONAL

$379.95

A-60
- 18 PIN IMPACT DOT MATRIX
- IBM OR EPSON COMPATIBLE
- 200 CPS 100 NLQ
- PUSH AND PULL TYPE PAPER FEED. SPECIAL!

$339.95



MAGNAVOX

8562
- RGB TTL, RGB ANALOG, COMPOSITE INPUTS
- 640 DOTS RESOLUTION (RGB) HORIZONTAL
- 240 LINES RESOLUTION (VERTICAL)
- 80 x 25 CHARACTER FIELD, 2000 CHARACTER TOTAL

$239*

8505
- RGB TTL, RGB ANALOG, COMPOSITE INPUTS
- 390 DOTS RESOLUTION (RGB) HORIZONTAL
- 240 LINES RESOLUTION (VERTICAL)
- 40 x 25 CHARACTER FIELD, 1000 CHARACTERS TOTAL

$199*

SOFTWARE CLOSE OUT!

CBS

DUCKS AHOY
ERNIE'S MAGIC SHAPES
BIG BIRD'S SPECIAL DELIVERY
LIGHT WAVES
WEATHER TAMERS
TIME BOUND
PEANUT BUTTER PANIC
MOVIE MUSICAL MADNESS
DREAM HOUSE
RAILROAD WORKS
ZONE RANGER
CRUSH, CRUMBLE & CHOMP
FLEET FEET

YOUR CHOICE
$5.88
LIMITED SUPPLY

COMMODORE

SCIENCE I
GENERAL LEDGER
PAYROLL
ACCOUNTS RECEIVABLE
ACCOUNTS PAYABLE
E-Z MAIL
INVENTORY MANAGEMENT
ASSEMBLER

YOUR CHOICE
$19.95
LIMITED SUPPLY

COSMI

FORBIDDEN FOREST
SUPER HUEY
TALLADE GO

YOUR CHOICE
$5.88
LIMITED SUPPLY

INTERFACES

P.P.I.	$34.95
XETEC JR	$39.95
XETEC SR	$59.95
M.W. 350 10K BUFFER	69.95

FOR ORDERS ONLY
IN N.Y. STATE CALL TOLL FREE
1-800-221-2760
OUT OF STATE CALL
1-800-631-1003
FOR ALL OTHER INFO **516-349-1020**

COMPUTER CENTERS OF AMERICA
81 TERMINAL DRIVE
PLAINVIEW, NY 11803

Can Your Computer Make YOU a MILLIONAIRE?

LOTTERY 64 • LOTTERY +4

It costs no more to buy a WINNING lottery ticket!

LOTTERY was designed to use the raw power of your computer to help you play the various lottery games: LOTTO, PICK 3, PICK 4, LUCKY LOTTERY, 6/49, SUPER LOTTO, etc. We do not believe there is a better system than the "original" LOTTERY 64 & LOTTERY +4.

Join the growing list of winners.

SPECIFY 64/128 or PLUS/4

To order, send $24.95 for each plus $3.00 postage and handling per order to (Illinois residents add 6% sales tax)

C.O.D. orders call: (312) 566-4647

Superior Micro Systems, Inc.
P.O. Box 713 • Wheeling, IL 60090
Dealer inquiries welcome

LOTTO CIPHER

GET THE BEST ODDS ON ANY LOTTERY
SIX NUMBER - PICK FOUR - DAILY GAME

- PRODUCES FOUR COMBINATIONS OF NUMBERS TO CHOOSE FROM.
- ANY AMOUNT OF BALLS AND NUMBERS CAN BE PROGRAMMED.
- PRINTS OUT PAST LOTTO NUMBERS DRAWN, PAST COMPUTER PICKS, AND NUMBER DRAW FREQUENCY LIST.
- RANDOM NUMBER GENERATOR INCLUDED.

$29.95 C-64/128

Window Magic

SUPER HI-RESOLUTION DRAWING IN MULTI OR MONO COLOR

- COPY
- FILL
- LINES
- DRAW
- COLOR SQUARES
- TYPES LETTERS AND GRAPHICS
- POLYGON SHAPES-EXPAND, SHRINK AND ROTATE, THEN STAMP ANYWHERE
- ZOOM PLOT-DRAW ON AN EXPANDED WINDOW AND YOUR DRAWING AT THE SAME TIME
- MIRROR, FLIP, AND SCROLLING WINDOWS
- ZOOM-EXPANDS A WINDOW TO DOUBLE SIZE
- SAVE AND LOAD YOUR WINDOWS ON DISK
- PRINTS ON STANDARD DOT MATRIX PRINTER
- CLONE COLOR ATTRIBUTES

$24.95 C-64/128

STOCK BROKER

PROFITS GUARANTEED OR YOUR MONEY BACK

BUYING GOOD QUALITY, VOLATILE ISSUES AND USING THIS TRADING SYSTEM WILL HAVE YOU FULLY INVESTED AT THE LOWEST PRICES AND CONVERTING TO CASH AS THE STOCK NEARS ITS PEAK.

- TECHNICAL TRADING THAT WORKS.
- BAR GRAPH PRINT-OUTS.
- RECORD UP TO 144 STOCKS ON A DISK.

$29.95 C-64/128

ACORN OF INDIANA, INC.

2721 OHIO STREET
MICHIGAN CITY, IN 46360

219-879-2284

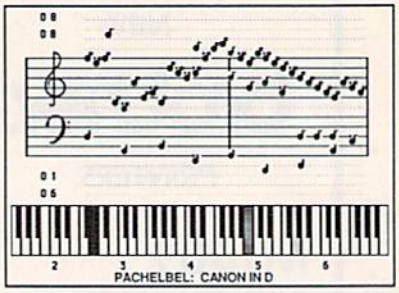
SHIPPING AND HANDLING, ADD $1.50 - C.O.D.'S ACCEPTED
VISA AND MASTER CARD ORDERS ADD 4%
INDIANA RESIDENTS ADD 5% SALES TAX

"Awesome...Professional"
-Stan Jones, Fairbanks News Miner

CLASSICAL MUSIC DISKS

3 HOURS OF MUSIC only **$19.95!**

Virtuoso performances with every note shown simultaneously on staff and keyboard. Many pieces accompanied with words. Play any portion, change instruments, key and tempo to suit your taste. Select from 9 instruments or create your own. Music can be programmed to play for hours at a time. Never has so much been offered for so low a price, and with satisfaction guaranteed.



Contains many complete works, including Beethoven's Waldstein sonata, several Mozart sonatas, Bach's Brandenburg Concerto No. 3 and Fugue in D minor, Chopin's Fantaisie Impromptu, Handel's Messiah, plus pieces by Debussey, Couperin, Albeniz, Christmas carols, and more.

For Commodore 64™ and 128™ computers. $19.95 plus $2.00 shipping. COD and Canadian checks accepted. Orders shipped immediately via first class mail.

15-DAY MONEYBACK GUARANTEE

Also available: EUPHONY, the powerful music processor used to create our music disks. Our customers call it the best on the market. For intermediate to advanced music students and programmers. About $25. Write for details.

TCO SOFTWARE

P.O. Box 81504, Fairbanks, AK 99708
907-479-4898

UTILITIES UNLIMITED

P.O. BOX 422
BRUSH PRAIRIE, WA 98606

Add $3.00 Shipping & Handling
Orders Shipped in 2 to 7 working days
(206) 254-6530
C.O.D.

$19.95 PARAMETERS R' US (100 pack)

The Newest and Most Effective Parameter Copier to date, is now ready for shipping. Parameters R' Us, will ELIMINATE all the protection of the most popular and most protected software available for the C-64/128. Parameters R' Us is completely menu driven and easy to use by anyone.

FEATURES INCLUDE: works in seconds, eliminates protection, menu driven, works on 1541 and the 1571, copies made are fully compatible with 3rd party drives, and updated every 2 mounts.

$4.99 PARAMETERS R' US (10 pack)

The 10 pack is for those that can't wait 2 mounts for the next release of the next (100 pack). This package will be released every 1 to 2 weeks and will include those titles that were just released.

$4.99 PARAMETERS R' US (GEOS pack)

This Parameter disk was designed just for GEOS and all its Utility packages. Not only will it eliminate the protection, but will also allow use of GEOS UTILITIES (desk pack, writers workshop, geo dex) with any GEOS that has been FIXED with this set of parameters.

$19.95 LOCK PICK-64/128

Was designed for the collector in mind. Lock pick will allow you to put up to 600 parameters on each side of a disk. Lock Pick-64/128 also breaks the protection out of keys and parameter for easy back up.

$29.95 LOCK PIK C64/128 (The Book)

Lock Pk 64/128 was put together by Utilities Unltd. as a tool for those who have a desire to find out how the heavy Hackers do it. This package includes:

1. Lock Pik book that gives you step by step instructions on BREAKING or backing up over 100 popular programs using Hesmon and Superedit. The instructions are so clear and precise that anyone can use it.

2. Lock Pik disk has Mesmon 64, Superedit, Disk Compare, Kernal Save, I/O Save, and Disk File Log with detailed instructions on how to use these programs all on 1 disk.

3. We also have a limited supply (7500) Hesmon cartridges that will be given out free with the first 7500 orders.

I think you will agree this is the best buy to come along in a long time, you get it all for $29.95.

MONTGOMERY GRANT

115 Nassau St. Between Beekman & Ann Sts. N.Y., N.Y. 10038 (212) 732-4500 Penn Station/Amtrack Level Beneath Madison Sq Garden, N.Y., N.Y. 10001
open Mon-Fri 8:30am - 6:30pm Sat 9:30am - 6pm Sun 9:30am - 5:30pm (212) 594-7140 open Mon-Fri 8:30am - 8pm Sat & Sun 9:30am - 7pm

PHONE and MAIL ORDERS ONLY Call Collect **(212) 732-4500**

VISA MasterCard DISCOVER

ALL COMPUTERS & PERIPHERALS COME COMPLETE WITH AC ADAPTOR, OWNER'S MANUAL AND ALL CONNECTING CABLES.

ALL MERCHANDISE IS BRAND NEW AND FACTORY FRESH. COMPLETE WITH MFR. U.S.A. WARRANTY.

commodore 128

128 K RAM Powered Personal Computer

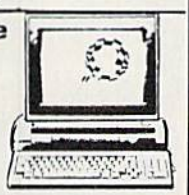
$245

commodore 64-C

64 K RAM Powered Home Computer

$169.95 *With Geos Program!*

commodore AMIGA



512 K RAM Powered Computer System

$799

PERIPHERALS

1541C NEW Disk Drive

$169.95

1541 Disk Drive

$149.95

1571 Disk Drive

$219.95

1802 Color Computer Monitor

$189.95

1902 RGB Color Monitor

$249.95

commodore COMPUTER PACKAGES

Get it all together & save!

64C COLOR PACKAGE

- Commodore 64C Computer
- Commodore 1541 Disk Drive
- Commodore Color Printer
- Color Monitor

With Geos Program!

$549.95

64 COMPLETE PACKAGE

- Commodore 64 Computer
- Commodore 1541 Disk Drive Printer
- Commodore Color Printer
- 12" Computer Monitor

$369.95

128 COMPLETE PACKAGE

- Commodore 128 Computer
- Commodore 1541 Disk Drive
- 12" Computer Monitor
- Commodore Color Printer

$499.95 TO SUBSTITUTE 1571 for 1541 ADD $70

128 DELUXE PACKAGE

- Commodore 128 Computer
- Commodore 1571 Disk Drive
- Commodore 1902 Color Monitor
- Commodore 80 Column Printer

$759.95 GEOS Program $39.95

APPLE IIC PACKAGE

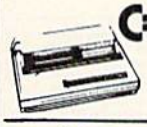
- Apple IIC Keyboard
- Built-in Disk Drive
- Apple Monitor
- Apple Monitor Stand
- All Cables and Adaptors
- 10 Floppy Diskettes

SCRIBE PRINTER IN STOCK

$649.95

COMPUTER PRINTERS

commodore MPS-803 PRINTER **$99.95**

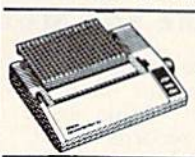


commodore MPS-1200 PRINTER **$249.95**

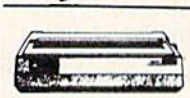
star NP-10 HIGH SPEED PRINTER **$189**

STAR POWER TYPE Daisy Wheel Letter Quality **$229.95**

STAR NX-10 Printer.....$199



EPSON HOMEWRITER 10 **$169.95**



OKIDATA 120 PRINTER **$199.95**

OKIMATE 20 with Plug 'n' Print **$189.95**

PERIPHERALS

1660 Phone Modem **$39.95**

1670 Automodem.....$129.95

1350 "Mouse" for any Commodore Computer **$39.95**

1700 128 K Expansion Module.....$89

1750 512 K Expansion Module $169

"MAGIC VOICE" Module ... $49.95

Certified check, bank check, Mastercard, Visa, Am-Ex, Diner's Club Carte-Blanche, and Discover Card accepted. Non-certified checks must wait 4-6 weeks for bank clearance. Money orders are non-certified checks. N.Y. residents add 8 and 1/4% sales tax. Prices and availability subject to change without notice-so call before placing your order. Not responsible for typographic errors. Returns of defective merchandise must have prior return authorization number.

THE SOFT 64 & 128 GROUP

Presents...
EXPLODE!
and
On Target
Disk
Drive
Alignment
Kit

EXPLODE! Add a NEW DIMENSION of POWER to your C-64, C-128*, SX-64 and the new 64-C.

EXPLODE! is a convenient to use cartridge, **EXPLODE!** will not interfere with program loading or operations... **EXPLODE!** can be left in at all times. Here is a list of features you will find in **EXPLODE!**
(1) A FASTLOAD that's 98% compatible (won't interfere with running of most programs) and over 500% faster loading.
(2) A HI-RES SCREEN DUMP with FULL 8" by 11" printout in TRUE GRAY SCALE, (all 16 colors are presented as shades of gray).
(3) Allows YOU TO SAVE a HI-RES SCREEN to DISK as a PGM FILE.
(4) A LOAD & RE-DISPLAY FEATURE for ALL HI-RES SCREEN FILES.
(5) A RESET BUTTON, a UTILITY DISK, D.O.S. wedge, TEXT dump printer, UN-NEW command, and many many other features!
(6) WORKS WITH C.B.M. printers (except 1526 and 802). Will also work with EPSON & C-ITOH types and most CLONES of all the above. (Please consult your manual).
ONLY **$29.95** + $1.50 S/H. COD's add $3.00 (prices are U.S. only) ILL. res. add 6% sales tax (**EXPLODE!** carries a 90 day warranty).
*in 64 mode only.

On Target Fast, Easy to use, Accurate and best of all Inexpensive. If those words describe your idea of ALIGNMENT PACKAGE for your 1540-41 or 1571 drive then read on! **On Target** will allow you to perform accurate disk drive alignments in 30 mins. or less. The concept is simple! Read the output of your disk drives head. If you can see that output...you would know whether you're in the middle of a track or not ie. aligned or not! **On Target** will do this for you without a computer!
Here's what you get when you buy the **On Target Alignment Kit.**
(1) A PRECISION ALIGNMENT METER
(2) A DISK with the (ALIGNMENT STANDARD) on one side and... (OPTIONAL un-protected PROGRAMS) on the other side.
(3) A LARGE, HEAVY 7 PAGE, fully illustrated manual, with a TIPS & HINTS page.
(4) One small jumper cable and a FULL 1 YEAR WARRANTY! Two versions are available. (A) For the 1540-41 only for **$25.00** or (B) for the 1540-41 and 1571 for only **$35.00** + $1.50 S/H (same rules apply here as for ordering **EXPLODE!**).

To Order: WRITE The Soft 64/128 Group
P.O. Box 111
Montgomery, IL. 60538
OR CALL
(312) 851-6667 ANYTIME
C.O.D. & M/O's Welcomed
Personal Checks 14 Days to Clear

Commodore SERVICE

POWER SUPPLY (C-64)	29.95
1541 (Alignment)	35.00
C-64 (Repair)	44.95
C-128 (Repair)	95.00
1541 (Repair & Alignment)	75.00
1571 (Alignment)	40.00
1571 (Repair & Align)	135.00
POWER SUPPLY (C-128)	99.95
PARTS C-64 & C-128	CALL

PARTS AND DIAGNOSTICS INCLUDED
(**FREE** Return Freight in the USA.
APO-FPO, C3PO add $10)

TO SAVE C.O.D. CHARGES - SEND UNIT & POWER SUPPLY WITH CHECK OR M.O.
(916) 635-3725

Second Source Engineering
2664-B Mercantile Drive
Rancho Cordova,
CA 95670

Copies of articles from this publication are now available from the UMI Article Clearinghouse.

For more information about the Clearinghouse, please fill out and mail back the coupon below.

UMI Article Clearinghouse

Yes! I would like to know more about UMI Article Clearinghouse. I am interested in electronic ordering through the following system(s):

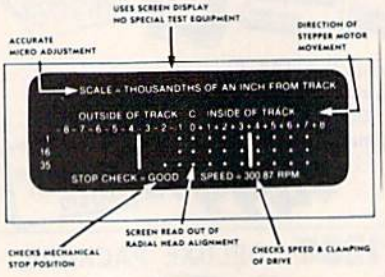
☐ DIALOG/Dialorder ☐ ITT Dialcom
☐ OnTyme ☐ OCLC ILL Subsystem
☐ Other (please specify)_____
☐ I am interested in sending my order by mail.
☐ Please send me your current catalog and user instructions for the system(s) I checked above.

Name_____
Title_____
Institution/Company_____
_____
Department_____
Address_____
City_____ State_____ Zip_____
Phone (_____)_____

Mail to: University Microfilms International
300 North Zeeb Road, Box 91 Ann Arbor, MI 48106

"I Saved Time and Money with Physical Exam."

I use a data base program to keep records for our club. I work a couple of nights each week updating records. Last week I experienced read errors several times. Luckily I had purchased a copy of 1541 Physical Exam last month and had saved a printed copy of the alignment test results. Running a new alignment test confirmed what I had suspected, my drive had drifted out of alignment. I am happy to report that I aligned my drive MYSELF. I saved time, (as my drive didn't have to sit in our local dealer's service dept. awaiting repair) and money — the Physical Exam program costs a fraction of what repair centers charge. And I can use it numerous times!


USES SCREEN DISPLAY
NO SPECIAL TEST EQUIPMENT
ACCURATE MICRO ADJUSTMENT
DIRECTION OF STEPPER MOTOR MOVEMENT
SCALE = THOUSANDTHS OF AN INCH FROM TRACK
OUTSIDE OF TRACK
INSIDE OF TRACK
STOP CHECK = GOOD
SPEED = 300.87 RPM
CHECKS MECHANICAL STOP POSITION
SCREEN READ OUT OF RADIAL HEAD ALIGNMENT
CHECKS SPEED & CLAMPING OF DRIVE

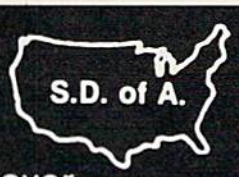
Package includes:
- True digital alignment disk with offset tracks.
- Speed test
- Mechanical stop test
- Instructions for performing alignment, adjusting speed and stop position.
- Hard copy mode to print test results for future comparison & reference.

Physical Exam is available for these drives: 1541, 1571, 8050, 8250, 4040, and SFD 1001. *Please Specify Drive!* • **$39.95** EA. + SHIP.
Hours: MON-SAT 10-6

800-762-5645

Cardinal Software 14840 Build America Dr. Woodbridge, VA 22191 Info: 491-6494

Software Discounters of America



For Orders Only—1-800-225-7638
PA Orders—1-800-223-7784
Customer Service 412-361-5291

- Free shipping on orders over $100 in continental USA
- No surcharge for VISA/MasterCard
- Your card is not charged until we ship

ABACUS BOOKS
C128 Basic 7.0 Internals
C128 Internals CALL
C128 Peeks & Pokes FOR
C128 Tricks & Tips PRICES
CPM 128 User's Guide
1571 Internals
GEOS—Inside & Out
ABACUS SOFTWARE
Assembler Monitor (D) $25
Basic (D) $25
Basic 128 ..... $39
Cad Pak (D) $25
Cad Pak 128 ..... $39
Chart Pak 128 ..... $25
Cobol (D) $25
Cobol 128 ..... $39
Forth (D) $25
Personal Portfolio Manager (D) $25
Power Plan (D) $25
Speed Term 128 ..... $25
Super C (D) $39
Super C 128 ..... $39
Super Pascal (D) $39
Super Pascal 128 ..... $39
ACCESS
Executive Leader Board Tourn. Disk $14
L.B. Famous Course Disk $14
Leader Board Golf (D) $25
Leader Board Tourn. Disk #1 ..... $14
Robotics Workshop . Call
Tenth Frame (D) $25
Triple Pack: BH1, BH2, Raid Over Moscow (D) .. $14
ACCOLADE
Ace of Aces (D) $19
Dambusters (D) $19
Fight Night (D) $19
Football (D) $19
Hardball (D) $19
Killed Until Dead (D) . $19
PSI-5 Trading (D) $19
ACTION SOFT
Thunder Chopper (D) $19
Up Periscope! (D) $19
ACTIVISION
Aliens (D) $23
Cross Country Road Race (D) $19
Gamemaker Library Disks Sports $14
Science Fiction $14
Gamemaker (D) $25
Greeting Card Maker (D) $23
Hacker 2 (D) $23
Little Computer People (D) $23
Music Studio (D) $23
Portal (D) $25
Shanghai (D) $23
Tass Times (D) $23
Transformers (D) $23
ARTWORX
Beach Blanket Volleyball (D) $9.88
Bridge 4.0 (D) $16
Data Disk #1 Female . $14
Data Disk #2 Male $14
Data Disk #3 Female . $14
Equestrian Show Jumper (D) $9.88
Highland Games (D) . $9.88
Hole In One + 6 (D) $9.88
International Hockey (D) $16
Police Cadet (D) $9.88
Strip Poker (D) $21
Thai Boxing (D) $9.88
AVALON HILL
Dr. Ruth (D) $19
MacBeth (D) $16
Super Sunday (D) $21
SBS 1985 Team Disk . $14
SBS Champs Disk $14
Spitfire '40 (D) $23
Title Bout (D) $19
Tournament Golf (D) . $19
AVANTAGE
Desert Fox (D) $9.88
Deceptor (D) $9.88
Spy vs. Spy 1 & 2 (D) $9.88
BATTERIES INCLUDED
Consultant (64 or 128) $36
Paperclip w/Spell (D) . $29
Paperclip II 128 ..... $49
BERKELEY SOFTWORKS
Geos 128 ..... Call
Geos 64 (D) $39
*Geo-Calc (D) $33
*Geo-Chart (D) $25
*Geos Desk Pak 1 (D) $23
*Geos Desk Pak 2 (D) Call
*Geo-Dex (D) $25
*Geo-File (D) $33
*Geos Font Pak (D) .. $19
Geos add-on programs only!
BRODERBUND
Bank St. Series ..... Call
Carmen Sandiego (D) $23
Karateka (D) $19
Print Shop (D) $26
P.S. Companion (D) .. $23
P.S. Graphics Library #1, #2, or #3 ... $16 Ea.
P.S. Graphics Library Holiday Edition ... $16
Toy Shop (D) $39
CBS
Body In Focus (D) ... $23
Mastering the SAT (D) . $44
Math Mileage (D) .. $6.88
Rich Scarry's Electronic Word Book (D) $12
Sesame St. Pals Around Town (D) ... $9
Success w/Algebra . Call
Success w/Math .... Call
Timebound (D) $6.88
CDA
America Cooks Series: American (D) $9.8
Theatre Europe (D) .. $23
DATA EAST
Commando (D) $23
Express Raider (D) .. Call
Ikari Warriors (D) $23
Karate Champ (D) ... $23
Kung Fu Master (D) .. $23
Tag Team Wrestling . $23
DAVIDSON
Algeblaster (D) $33
Math Blaster (D) $33
Speed Reader II (D) .. $33
Spell It (D) $33
Word Attack (D) $33
ELECTRIC DREAMS
Rocky Horror Show (D) $19
Spindizzy (D) $19
Titanic Recovery Mission (D) $19
Zoids (D) $19
ELECTRONIC ARTS
Software Classic Series:
Archon (D) $9.88
Heart of Africa (D) . $9.88
Mail Order Monsters (D) $9.88
M.U.L.E. (D) $9.88
Music Const. Set (D) . $9.88
One-on-One (D) $9.88
Pinball Const. Set (D) $9.88
Racing Dest. Set (D) $9.88
Seven Cities Gold (D) . $9.88
Super Boulder Dash (D) $9.88
Touchdown Football (D) $9.88
ELECTRONIC ARTS
Adv. Const. Set (D) .. $26
America's Cup Sailing (D) $23
Amnesia (D) $26
Archon 2: Adept (D) .. $23
Arctic Fox (D) $23
Balakon Raider (D) .. $23
Bard's Tale 1 (D) $26
Bard's Tale 2: The Destiny Knight (D) . $26
Battlefront (D) $26
Chessmaster 2000 (D) $26
Lords of Conquest (D) . $23
Make Your Own Murder Party (D) .. $23
Marble Madness (D) . $23
Movie Maker (D) $23
Scrabble (D) $23
Skyfox (D) $23
Star Fleet I (D) $26
Timothy Leary's Mind Mirror (D) ... $23
Ultimate Wizard (D) .. $19
EPYX
Barbie (D) $9
Champ. Wrestling (D) . $23
Destroyer (D) $23
Fast Load (R) $23
Gateway to Aspshai (D) . $9
Impossible Mission (D) . $9
Jumpman (D) $9
Movie Monster (D) ... $23
Multiplan 128 ..... $33
P.S. Graphics Scrapbook 1: Sports (D) $16
P.S. Graphics Scrapbook 2: Off the Wall (D) ... $16
Summer Games 2 (D) $23
Super Cycle (D) $23
Winter Games (D) $23
World Championship Karate (D) $17.95
World Games (D) $23
FIREBIRD
Elite (D) $19
Starglider (D) $25
The Pawn (D) $25
Tracker (D) $25
FISHER PRICE
Alpha Build (R) $6.88
Dance Fantasy (R) . $6.88
Hop Along Counting (R) $6.88
Linking Logic (R) .. $6.88
Memory Manor (R) . $6.88
Sea Speller (R) $6.88
Buy 3, get 1 free!
GAMESTAR
Championship Baseball '86 ..... $23
Champ. Basketball (D) . $23
Star Rank Boxing (D) . $19
GFL Championship Football (D) $23
On-Court Tennis (D) . $19
HES
Microsoft Multiplan (D) $19
Project Space Station (D) $19
HI-TECH EXPRESSIONS
Card Ware (D) $6.88
Heart Ware (D) $6.88
Party Ware (D) $9.88
INFOCOM
A Mind Forever Voyaging 128 ..... $23
Ballyhoo (D) $25
Enchanter (D) $23
Hitchhiker's Guide to the Galaxy (D) $23
Hollywood Hijinx (D) . $25
Leather Goddesses . $23
Moonmist (D) $23
Suspect (D) $25
Trinity 128 ..... $25
Wishbringer (D) $23
Zork 1 (D) $23
Zork 2 or 3 (D) $25
KONAMI
Yie Ar Kung Fu/ Rush 'N Attack (D) $19
MASTERTRONIC
Action Biker (D) ... $6.88
Bounder (D) $6.88
Captain Zap (D) $6.88
Electra Glide (D) ... $6.88
Infinity Machine (R) . $12
5-A-Side Soccer (D) $6.88
Knight Games (D) .. $6.88
Last V-8 (D) $6.88
Magnum Joystick ... $12
Master of Magic (D) $6.88
Ninja (D) $6.88
Pro Golf (D) $6.88
Shogun (D) $6.88
Speed King (D) $6.88
The Slugger (D) $6.88
Vegas Poker & Jackpot (D) $6.88
MICROLEAGUE
Baseball (D) $25
Box Score Stats (D) .. $16
General Manager (D) . $25
1985 Team Data Disk $14
1986 Team Data Disk $14
WWF Wrestling (D) .. $25
MICROPROSE
Acrojet (D) $16
Conflict in Viet Nam (D) $25
Crusade in Europe (D) $25
Decision in Desert (D) $25
F-15 Strike Eagle (D) . $23
Gunship (D) $23
Kennedy Approach (D) $16
Silent Service (D) $23
Top Gunner (D) $16
MINDSCAPE
Bank St. Music Writer (D) $9.88
Bop & Wrestle (D) ... $19
Crossword Magic (D) $33
Fairlight (D) $19
Fist (D) $19
High Roller (D) $19
Indoor Sports (D) $19
Infiltrator (D) $19
Perfect College (D) .. $14
Perfect Score SAT (D) $44
The American Challenge Sailing Simulation (D) $19
MISC
CSM 1541 Align Kit (D) $29
Central Point Copy 2 (D) $23
Font Master 2 (D) $33
Font Master 128 .... $39
Gato (D) $19
Snapshot 64 (R) $39
Superbase 64 (D) $47
Superbase 128 (D) ... $59
Superscript 64 (D) ... $33
Superscript 128 ..... $47
ORIGIN
Autoduel (D) $32
Moebius (D) $26
Ogre (D) $26
Ultima 3 (D) $32
Ultima 4 (D) $39
RELEVANT
Billboard Maker (D) .. $25
Icon Factory (D) $25
Photo Finish (D) $19
SCARBOROUGH
Build A Book (D) $16
Mastertype (D) $25
SIMON & SCHUSTER
Chem. Lab (D) $25
Great Int'l. Paper Airplane Const. (D) $19
Star Trek: Promethean Prophecy (D) $19
Typing Tutor 3 (D) ... $25
SPRINGBOARD
Certificate Maker (D) $33
C.M. Library Vol. 1 ... $23
Newsroom (D) $33
N.R. Clip Art Vol. 1 (D) $19
N.R. Clip Art Vol. 2 (D) $25
N.R. Clip Art Vol. 3 (D) $19
Print Shop Graphics Expander (D) $23
SSI
Battle Group (D) $37
Battle of Antietam (D) $33
Colonial Conquest (D) $25
Gemstone Healer (D) $19
Gettysburg (D) $37
Kampfgruppe (D) $37
Mech Brigade (D) $37
NAM (D) $25
Phantasie (D) $25
Phantasie 2 (D) $25
Rings of Zilfin (D) ... $25
Roadwar 2000 (D) ... $25
Shard of Spring (D) .. $25
War Game Construction Set (D) . $19
Warship (D) $39
Wizard's Crown (D) .. $25
SOFTSYNC
Personal Accountant (D) $23
SUBLOGIC
Baseball (D) $32
Flight Simulator 2 (D) . $32
F.S. Scenery Disks .. Call
Football (D) $26
Jet (D) $26
TELARIUM
Amazon (D) $9.88
Fahrenheit 451 (D) . $9.88
Dragon World (D) .. $9.88
Rendezvous (D) ... $9.88
THUNDER MOUNTAIN
Cyrus Chess (D) ... $6.88
Maxi Golf (D) $6.88
Mr. Pixel's Cartoon Kit (D) .. $6.88
Rambo: First Blood Part II (D) $6.88
The Eliminator (D) . $6.88
TIMEWORKS
Accts. Payable (D) ... $39
Accts. Receivable (D) $39
Data Manager 2 (D) ... $25
Data Manager 128 ... $43
General Ledger (D) .. $39
Inventory Mgmt (D) .. $39
Partner 64 (R) $39
Partner 128 (R) $43
Swiftcalc/Sideways (D) $25
Swiftcalc/ Sideways 128 .... $43
Swiftax '86 ..... $33
Sylvia Porter's Personal Fin. Planner (D) 64 .. $33
Sylvia Porter's Personal Fin. Planner 128 ... $43
Word Writer w/ Speller (D) $33
Word Writer w/85000 Word Speller 128 .. $43
UNISON WORLD
Art Gallery 1 (D) $16
Art Gallery 2 (D) $16
Print Master (D) $23
VALUE TIME
Art Library 1 or 2 (D) $9.88
Calendars & Stationery (D) ... $9.88
Greeting Cards (D) . $9.88
Signs & Banners (D) $9.88
WEEKLY READER
Stickybear Series:
ABC's (D) $16
Math (D) $16
Numbers (D) $16
Opposites (D) $16
Reading (D) $16
Shapes (D) $16
Spellgrabber (D) .. $16
Typing (D) $16
WINDHAM CLASSICS
Alice In Wonderland (D) . $6.88
Below the Root (D) . $6.88
Swiss Family Robinson (D) $6.88
Treasure Island (D) . $6.88
Wizard of Oz (D) ... $6.88
ACCESSORIES
Bonus SS, DD .. $5.99 Bx
Bonus DS, DD .. $6.99 Bx
Compuserve Starter Kit (a $25 usage Credit) . $19
Disk Case (Holds 75) .. $9
Disk Drive Cleaner $9
Disk Notcher $7
Dow Jones Starter Kit $9.88
Epyx 500XJ Joystick . $14
Wico Bat Handle $17
Wico Boss $12

P.O. BOX 111327—DEPT. CG—BLAWNOX, PA 15238

*Please Read The Following Ordering Terms & Conditions Carefully Before Placing Your Order: Orders with cashiers check or money order shipped immediately. Personal & Company checks, allow 3 weeks clearance. No C.O.D.'s! *Shipping: Continental U.S.A.*—Orders under $100 add $3; *free shipping on orders over $100. AK, HI, FPO, APO—add $5 on all orders. Canada & Puerto Rico—add $10 on all orders.* Sorry, no other international orders accepted! *PA residents add 6% sales tax on the total amount of order including shipping charges!* Prices subject to change without notice. *REASONS FOR CALLING CUSTOMER SERVICE—412-361-5291 (1)* Status of order or back order *(2)* If any merchandise purchased within 60 days from S.D. of A. is defective, please call for a return authorization number. Defective merchandise will be replaced with the same merchandise only. NO CREDITS! After 60 days please refer to the manufacturers warranty included with the merchandise & return directly to the manufacturer. *Customer service will not accept collect calls or calls on S.D. OF A.'s 800# order lines! REGULAR HOURS: Mon.-Fri. 9AM-5:30 PM, Sat. 10AM-4PM Eastern Time.* Have you seen our on line catalog of 1000 software titles for Commodore, Atari, Apple, IBM and Amiga? It's on Compuserve Electronic Mall—just type GO SDA and shopping for software will never be the same again!

ABBY'S DISCOUNT SOFTWARE

COMMODORE SOFTWARE

PROGRAMMING AIDS

Assembler	$3.49
Super Expander	$3.49
Screen Editor	$3.49

EDUCATION & LEARNING

A Bee C's (R)	$2.99
Easy Match/Easy Count	$2.99
What's Next?	$2.99
Fishmetic	$2.99
Speed/Bingo Math	$2.99
Science I	$2.99
Science III	$2.99
Easy Lesson/Easy Quiz	$2.99
English VII	$2.99

INFOCOM MIND GAMES

Zork II	$4.99
Zork III	$4.99
Suspended	$4.99
Starcross	$4.99
Deadline	$4.99

MISCELLANEOUS

Music Composer	$3.49
Accounts Receivable/ Billing	$5.00
Payroll	$5.00
Cassette Bonus Pak	$3.49

VIDEO ARCADE GAMES

Clowns (R)	$3.49
Tooth Invaders (R)	$3.49
Kickman (R)	$3.49
Lazarian (R)	$3.49
Blueprint (R)	$3.49
Solar Fox (R)	$3.49
Star Ranger (R)	$3.49
Frogmaster (R)	$3.49
Viduzzles (R)	$3.49
Satan's Hollow	$3.49
Chess	$3.49
Rally Speedway	$3.49

CALL ON THESE AND OTHER PRODUCTS. WE CARRY A COMPLETE LINE OF SOFTWARE AND HARDWARE.

TOP HITS

AMIGA SOFTWARE

Arctic Fox	$ 30
Marble Madness	$ 32
Instant Music	$ 39
Deluxe Video	$ 72
Deluxe Print	$ 72
Art Disk Vol. II	$ 24
Deluxe Paint	$ 72
Art Disk Vol. I	$ 24
Sky Fox	$ 29
dB Man	$109
Defender of the Crown	$ 34
Scribble With Spell Checker	$ 79
Deluxe Music	$ 69
Leader Board Golf	$ 29
Amiga Assembler	$ 79
Analyze	$ 69
Music Studio	$ 39
Aegis Animator	$ 99
Aegis Draw Plus	CALL
The Publisher	CALL
The Perfect Score	$ 59
Flow	$ 79
Grabbit	$ 25
Marauder II	$ 39
Kid Talk	$ 39
Chessmaster 2000	$ 35
Little Computer People	$ 29
Typing Tutor/Word Invaders	$ 27
Zuma Fonts 1, 2 or 3	ea. $ 26
Flight Simulator	$ 39
Speller Bee	$ 39
A-Copier	$ 29
A-Report	$ 34
A-Term	$ 34
Printmaster Plus	$ 39
Art Gallery I, II	ea. $ 24
Online	$ 56
Mean 18	$ 39
Talking Coloring Book	$ 24
The King of Chicago	CALL
Super Base	$129
GBA Championship Basketball	$ 35
Championship Baseball	$ 35
ALL INFOCOM TITLES	CALL

C64/C128 SOFTWARE

ALL ABACUS TITLES	CALL
ALL MASTERTRONICS TITLES	CALL
Auto Duel	$32
Fontmaster 128	$35
Bard Tale II	$29
Certificate Maker	$39
G.E.O.S.	$49
Writer's Workshop	$39
Geo Dex	$29
G.E.O.S. Desk Pak	$27
G.E.O.S. Font Pak #1	$24
Paperclip II/128	$59
Championship Baseball	$27
Gunship	$27
Marble Madness	CALL
High Roller	$24
Indoor Sports	$24
Leather Goddeses of Phobos	$27
Ninja	$ 8
Chess Master 2000	$29
Pocket Writer II	CALL
Battle Front	$29
Super Huey II	$16
Flight Simulator II	$39
Sublogic Baseball	$39
Sublogic Football	$39
Pawn	$34
Zork Trilogy	$45
Hitchhiker's Guide To The Galaxy	$25
Thai Boxing	$12
Warship	$35
Elite	$24
Hardball	$25
Copy II	$29
Fast Hack'em	$29
Fast Load	$31
Leader Board Golf	$31
L.B. Tournament Disk	$15
L.B. Executive Disk	$15
Print Shop	$35
P.S. Graphics Library I, II & III	ea. $18
Snapshot	$39
Merlin 64/128	CALL

HARDWARE

COMMODORE

512K RGB System	CALL
256K Amiga	CALL
A1080 RGB Monitor	CALL
A1010 3½" Disk Drive	CALL
A1050 256K Expansion	CALL
A1680 1200 Baud Modem	CALL
C-128 Computer	CALL
Vic 1571 Disk Drive	CALL
Vic 1581 Disk Drive	CALL
D64C Computer	CALL
D1541C Computer	CALL
Vic 1750 Expansion	CALL
Vic 1351 Mouse	CALL

CASIO WRITER

CW-20/CW-30	CALL

AMSTRAD

Word Processor with NLQ Printer	CALL

DUST COVERS

Amiga System Pack	$15.00
Amiga Computer (w/o Monitor)	$ 9.00
Amiga Keyboard	$ 6.50
Amiga 1080 Color Monitor	$12.00
Amiga 1010 Disk Drive	$ 7.00
C-128 Computer	$ 7.00
Vic 20/64 Computer	$ 7.00
1571 Disk Drive	$ 7.00
1541 Disk Drive	$ 7.00
1525 Printer	$ 9.00
1526 Printer	$ 9.00
MPS 1000 W or W/O Tractor	ea. $ 9.00
MPS 801/802 Printer	ea. $ 9.00
MPS 803 W or W/O Tractor	ea. $ 7.00

RIBBONS

Commodore 1525	$7.50
Commodore 1526/802	$7.00
Commodore MPS-801	$7.50
Commodore MPS-803	$9.00
Epson MX/FX/RX-80	ea. $5.00
Panasonic 1080/1091/1092	ea. $8.50
Okimate 10 Black/Color	ea. $6.00
Star Gemini Black	$2.50
Star Gemini Color*	$3.50

*Please State Choice of Color

MEMOREX DISKS

MD1 - Work System (20 5¼" Disks & 50 File Box)	$18.95

BULK DISKS

Gold Star 3½" DS/DD	ea. $1.79
Sony 3½" DS/DD	ea. $2.05

MEMOREX PAPER

100 Sheets 20 lb. Ivory	$2.45
250 Sheets 20 lb. White	$3.95
250 Sheets 15 lb. White	$3.95

WORLDS OF WONDER LAZER TAG

LAZER TAG GAME KIT — Includes Star Lyte (Hand Unit), Star Belt & Star Sensor	$45.00

ACCESSORIES

Lazer Tag Star Vest	$18.00
Lazer Tag Star Sensor	$20.00
Lazer Tag Star Band	$ 9.00
Lazer Tag Star Helmet	$36.00
Lazer Tag Star Cap	$20.00

PQ *The* ***Party Quiz*** *Game*
Family Learning System
Computer Question/Answer Game

SUNCOM

$14.95

LIMITED QUANTITIES

ALL TITLES ON DISK UNLESS MARKED (R) FOR ROM CARTRIDGE & (C) FOR CASSETTE TAPE

Order Line
1-800-282-0333
ORDERS ONLY! Sales Personnel Do Not Have Information on Previous Orders or Product Specs.

WE CHECK FOR STOLEN VISA & MASTERCARD
M-F 10 a.m.-8 p.m.; Sat. 10-3 ET
37 S. Broad Street, Fairborn, OH 45324

Customer Service & Ohio Residents
1-513-879-9699
AD #G-047

VISA

SOFTWARE ONLY — Prepaid orders over $50 receive free shipping via UPS in continental U.S. Please add $2 orders under $50. HARDWARE and all orders requiring shipment via U.S. Post Office are subject to additional freight charges. Add $5 for COD orders. VISA/MasterCard orders add $2 service charge. Ohio residents add 6% sales tax. Personal checks require a three-week waiting period. No waiting when paid by credit card, certified check or money order. All items subject to availability and price change. PLEASE CITE AD NUMBER WHEN ORDERING. ALL RETURNS MUST BE ACCOMPANIED BY AN AUTHORIZATION NUMBER.

MasterCard

Have your Commodore® look as smart as it works.

Consolidate your 64, 64C and 128 system with the Command Center.

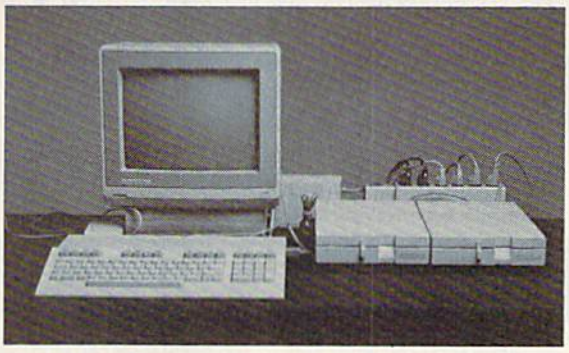
With the Command Center, your system is compact and complete.

Get your workspace back again.

The Command Center will untangle your wires, unclutter your desk and put peripherals at your fingertips. Condensing your whole system into one compact unit, you might consider it the **ultimate** Commodore peripheral. You get Commodore value with the look of a more expensive system.

Just look at all it includes:

- **Built-in AC Power Strip** with power surge and voltage spike protection, line noise filtering and power outlets.
- **Built-in Drive/CPU Cooling Fan** to prevent overheating.
- **Modular Telephone Plug**, with its own on-line/off-line telecommunications switch. (Option on 64 and 64C).
- **Master AC Switch** for easy system power-up.
- **Single or Dual Drive Configurations** with the standard drive insert.



Without the Command Center your Commodore peripherals look cluttered and take up most of your desk top.

Many built-in conveniences add to the Command Center's value.

®Commodore is a registered trademark of Commodore Electronics Ltd.

KETEK

Free 30-day trial offer
and one-year warranty.

For faster service, call
1-800-626-4582 toll-free
1-319-338-7123 (Iowa Residents)

KETEK P.O. Box 203
Oakdale, IA 52319

YES! Rush me a Command Center to complete my system. I may enjoy it for up to 30 days and return it for a full refund.

- ☐ 64 ..... $119.95
- ☐ 64C $129.95
- ☐ 128 ..... $149.95

(Please include $3.50 for shipping and handling.)

Name _____

Address _____

City _____ State _____ Zip _____

Phone Number _____

DEALER INQUIRIES INVITED

ADVANCED DETECTION & CONTROL

NO INTERFACE IS EASIER TO USE

- Control lights, appliances, heating and cooling systems, relays and motors.
- Connect to temperature, light, sound, moisture, fluid level and pressure sensors.
- 32 separate buffered digital output lines.
- 32 separate digital input lines.

BH100 I/O Card User Manual, instructions, sample programs & diagrams of typical hookups. **$129**	**8 Channel A/D Plug-in Conversion Module $45** 8 bit 0-5V A/D converter.
Complete I/O Course Includes BH100, Beginner's Module, Course Manual and User Manual. **$159**	**Security System Module** With siren, switches and software. **$35**
The Beginner's I/O Interface Course Manual $15	**Beginner's Module** With 8 LEDs, 8 switches and 1 relay. **$25**

INTELLIGENT I/O

P.O. BOX 70 • POTSDAM, NY 13676

VISA (315) 265-6350 MasterCard

Call for free brochure today!

We ship within 48 hours
Add $4 for postage and specify C-64 or VIC-20.

The Handicapper

Use your **Commodore 64/128** to improve your performance at the track! Programs for **Thoroughbred, Harness** and **Greyhound** racing rank the horses or dogs in each race quickly and easily. All the information is readily available from the *Racing Form*, harness or dog track program.

Thoroughbred factors include speed, distance, past performance, weight, class, jockey's record, beaten favorite and post position. **Harness factors** include speed, post position, driver's record, breaking tendencies, class, parked-out signs and beaten favorite. **Greyhound factors** include speed, past performance, maneuvering ability, favorite box, class, kennel record, beaten favorite and breaking ability.

Complete instructions and wagering guide included. **Thoroughbred, Harness** or **Greyhound Handicappers**, $39.95 each on tape or disk. Any two for $59.95 or all three for $79.95.

MasterCard **Federal Hill Software**
8134 Scotts Level Rd.
Baltimore, MD 21208 VISA®

Toll Free Orders 800-628-2828 Ext. 850
For Information 301-521-4886

COMMODORE 128

SUPER SALE FROM ComputAbility™

ORDER NOW — QUANTITIES LIMITED

- NO EXCESSIVE SHIPPING CHARGES
- NO HIDDEN CREDIT SURCHARGES
- ALL MERCHANDISE IS FACTORY NEW AND INCLUDES FULL MANUFACTURER'S WARRANTIES

SUPER C-128 PACKAGE #1

- COMMODORE 128 COMPUTER
- 1571 DISK DRIVE

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 300 ORDERS

$489

SUPER C-128 PACKAGE #2

- COMMODORE 128 COMPUTER
- 1571 DISK DRIVE
- 1902 MONITOR

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 100 ORDERS

$779

COMMODORE 128 COMPUTER

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 100 ORDERS

$249

1571 DISK DRIVE

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 100 ORDERS
$249

1902 RGB COMPOSITE MONITOR

FREE SHIPPING IN CONTINENTAL USA
NO SURCHARGES ON CREDIT CARDS
LIMITED TO FIRST 100 ORDERS
$289

SINCE 1982

COMMODORE 128 is a trademark of Commodore Electronics, Ltd.

ComputAbility™

800-558-0003

IN WISCONSIN 414-357-8181
TELEX NUMBER 9102406440

ORDERS OUTSIDE CONTINENTAL USA SEE ORDERING INFORMATION NEXT PAGE ►

MOVING SALE SPECIAL #1
COMMODORE 128 COMPUTER
1571 DISK DRIVE
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$489
(LIMITED TO FIRST 300 ORDERS)

MOVING SALE SPECIAL #2
NX-10 PRINTER
XETEC SUPER GRAPHIC INTERFACE
2 EXTRA NX-10 RIBBONS
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$279

MOVING SALE SPECIAL #3
PANASONIC 1080i PRINTER
XETEC SUPER GRAPHIC INTERFACE
1 EXTRA RIBBON
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$279

MOVING SALE SPECIAL #4
PANASONIC 1091i PRINTER
XETEC SUPER GRAPHIC INTERFACE
1 EXTRA RIBBON
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$339

MOVING SALE SPECIAL #5
COMMODORE 128 COMPUTER
1571 DISK DRIVE
1902 RGB MONITOR
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$779
(LIMITED TO FIRST 100 ORDERS)

MOVING SALE SPECIAL #6
SEIKOSHA SP1000VC PRINTER
BUILT-IN GRAPHICS INTERFACE
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
$179

MOVING SALE SPECIAL #7
COMMODORE 64C COMPUTER
1541C DISK DRIVE
1802C MONITOR
NO SURCHARGES ON CREDIT CARDS
FREE DELIVERY IN CONTINENTAL USA
PRICE TOO LOW TO ADVERTISE!!

MOVING SALE SPECIAL #8
COMMODORE 1670 MODEM 129
COMMODORE 1351 MOUSE44.95
COMMODORE 1750
RAM EXPANDER 169
AVATEX 1200 HC MODEM . . 129
PANASONIC 1080i PRINTER . 199
PANASONIC 1091i PRINTER . 259

COMPUTABILITY MOVING SALE

WE ARE MOVING TO LARGER AND EXPANDED OFFICE AND WAREHOUSE FACILITIES TO SERVE YOU BETTER AT LOWER PRICES

XETEC SUPERGRAPHIC INTERFACE **69.95**

COMMODORE 64C W/GEOS . . . . . **CALL**

1541C DISK DRIVE . . . **CALL**

MONITORS

MAGNAVOX 8562 RGB/COMP . . . . . CALL
COMMODORE 1802C 209
THOMSON 14" RGB/COMP 279
COMMODORE 1902 279

STAR MICRONICS

NX-10 209
NL-10C 279
NP-10 169
NX-15 339
ND-15 449
NR-15 559
POWERTYPE 189
NB-24/15 . . . . . CALL

AMIGA COMPUTER SYSTEMS

AND SOFTWARE PRODUCTS

CALL

FOR PRICE & AVAILABILITY

SUPER SPECIALS*

ELECTRONIC ARTS™
FOR C-64/C-128

Archon II 10.95
Financial Cookbook 10.95
Mind Mirror 10.95
Movie Maker 10.95
Skyfox 10.95
Ultimate Wizard . 10.95

***SUPER SPECIAL PRICES EFFECTIVE NOW THRU APRIL 30, 1987**

C-128 SOFTWARE

Superbase 128 . . . . . 57.95
Paper Clip II 47.95
Wordwriter 128 . . . . 42.95
Data Manager 128 . . 42.95
Superscript 128 . . . . . 46.95
Perfect Writer 49.95
Sylvia Porter 128 . . . 42.95
Pocket Filer 2 . . . . . 36.95
Pocket Writer 2 . . . . . 36.95
Basic Compiler 128 . . 39.95
Fontmaster 128 . . . . 36.95
Multiplan 128 . . . . . 27.95
Chart Pak 128 . . . . . 25.95
Cad Pak 128 . . . . . 39.95
Super C Compiler . . . 39.95
Cobol 128 . . . . . 39.95
Speed Term 128 . . . . . 25.95
Pocket Planner 2 . . . 36.95
Mach V/128 . . . . . 32.95
Super Pascal 128 . . . . 39.95
Super Pak 128 . . . . . 46.95
Swiftcalc 128 . . . . . 42.95
Partner 128 . . . . . 42.95
Fleet System 4 . . . . . 46.95

COMMODORE 64 SOFTWARE — **NEW** Lower Prices — *COMMODORE 64 SOFTWARE*

ABACUS 64

Chartpak 25.95
Cad-Pak 25.95
Powerplan 25.95
Super C Compiler . . . 39.95
Super Pascal 39.95
Basic Compiler 25.95
Forth 25.95
Geos Inside & Out . . . 16.95
Personal Portfolio . . . 25.95
Xper System 39.95

ACCESS

Mach V-Cart 21.95
Leader Board 24.95
Tournament Disk . . . 14.95
Tenth Frame 24.95
Executive Disk 14.95
Robotic Workshop . . . . Call
Triple Pak 14.95
Famous Courses 14.95

ACTIVISION

Gamemaker 25.95
2 on 2 Basketball . . . 22.95
Hacker II 22.95
Tass Times 22.95
Shanghai 22.95
Champ Baseball '86 . 22.95
Transformers 22.95
Gamemaker Library . 14.95
Labyrinth 22.95
Howard The Duck . . . 22.95
GFL Football 22.95
Greet. Card Maker . . 22.95
Aliens 22.95
Portal 25.95

BERKLEY SOFTWORKS

Geos 37.95
Geopublish 34.95
Geofile 34.95
Geocalc 34.95
Writer's Workshop . . 32.95
Geochart 27.95
Geodex 25.95
Deskpak I 22.95
Font Pak I 19.95

BRODERBUND

Bank St. Series(Ea) . . 32.95
Graphic Lib. 1,2 or 3 . 16.95
P. S. Companion 22.95
Toy Shop 39.95
Print Shop 28.95
Carmen Sandiego . . . 22.95
Thinking Cap 22.95
Type . . . . . CALL

EPYX

Destroyer 22.95
Fast Load 22.95
Movie Monster 22.95
Champ Wrestling . . . 22.95
World Games 22.95
Winter Games 22.95
Summer Games 14.95
Apshai Trilogy 14.95
Vorpal Utility 14.95
Multiplan 27.95
Super Cycle 22.95
St. Sports Basketball . 22.95
St. Sports Baseball . . 22.95
Summer Games 2 . . . 22.95
Sub Battle Simulat . . 22.95

ELECTRIC DREAMS

Titanic 19.95
Rocky Horror 19.95
Spindizzy 19.95

MINDSCAPE

Perfect Score 44.95
Crossword Magic . . . 32.95
Halley's Project 11.95
High Roller 19.95
Infiltrator 19.95
Bop 'N' Wrestle 19.95
Fair Light 19.95
Indoor Sports 19.95
American Challenge . 19.95
Defender of the Crown CALL

BATTERIES INCLUDED

Home Pak 14.95
Consultant 34.95
Paperclip/Spell 27.95

ACCOLADE

Ace of Aces 18.95
Kill Until Dead 18.95
Hardball 18.95
Fight Night 18.95
PSI Trading Co. 18.95

MICROPROSE

Silent Service 22.95
Gunship 22.95
Accrojet 16.95
Top Gunner 16.95
F-15 Strike Eagle 22.95
Kennedy Approach . . 16.95
Crusade in Europe . . 25.95
Conflict in Vietnam . 25.95
Decision in the Desert 25.95

TIMEWORKS

Business Systems . . . 39.95
Wordwriter/Spell . . . 32.95
Swiftcalc/Sideways . . 25.95
Data Manager II 25.95
Sylvia Porter 64 . . . . 32.95
Evelyn Wood 25.95
Sideways 19.95
Partner 64 . . . . . 39.95

SPRINGBOARD

Newsroom 30.95
Certificate Maker . . . 30.95
Graphics Expander . . 21.95
Clip Art 1 or 3 . . . . . 18.95
Clip Art 2 . . . . . 21.95
Cert. Maker Lib 1 . . . 21.95

SSI

Wizard's Crown 27.95
Broadsides 24.95
Field of Fire 24.95
Carrier Force 37.95
Computer Ambush . . 37.95
Kampfgruppe 37.95
Phantasie 24.95
Phantasie II 27.95
Mech Brigade 37.95
Rings of Zilfin 27.95
Battle Group 39.95
Shard of Spring 27.95
Roadwar 2000 . . . . . 27.95
Warship 39.95
Gemstone Healer . . . 20.95
War in S. Pacific . . . 39.95
Wargame Construction 20.95

MISCELLANEOUS 64

Final Cartridge 39.95
Fellowship/Ring 23.95
Hobitt 23.95
Leather Goddesses . . 22.95
Moonmist 22.95
Hollywood Hijinks . . 22.95
Business Form Shop . 25.95
Fontmaster 2 . . . . . 30.95
Disney Comic Strip . . 23.95
Disney Card & Party . 23.95
Micro League Baseball . 25.95
WWF Wrestling 25.95
Starfleet I 26.95
Battle Front 26.95
Elite 22.95
Pocket Dictionary . . . 10.95
Thunder Chopper . . . 19.95
Up Periscope 19.95
Contriver Mouse 36.95
The Pawn 25.95
Tracker 25.95
Starglider 25.95
Jet 27.95
Sublogic Football . . . 27.95
Flight Simulatorll . . . 33.95
Sublogic Baseball . . . 33.95
Printmaster 21.95
Art Gallery 1 or 2 . . . 16.95
Superscript 64 . . . . . 32.95
Superbase 64 . . . . . 46.95
Animation Station . . 49.95
Rushin Attack/Kung Fu 19.95

DATASOFT

Video Title Shop 18.95
Gunslinger 18.95
Alt. Reality/City 24.95
Alt. Reality/Dungeon 24.95
Mercenary 18.95
Neverending Story . . 18.95

DATA EAST

Karate Champ 22.95
Kung Fu Master 22.95
Commando 22.95
Tag Team Wrestling . . 22.95
Breakthrough 22.95

ELECTRONIC ARTS

Archon 10.95
Archon II 10.95
Financial Cookbook . 10.95
Heart of Africa 10.95
Mail Ord. Monsters . . 10.95
Mind Mirror 10.95
Movie Maker 10.95
Mule 10.95
Music Construction . 10.95
One On One 10.95
Pinball Construction . 10.95
Racing Destruction . . 10.95
Seven Cities of Gold . 10.95
Skyfox 10.95
Super Boulderdash . . 10.95
Touchdown Football . 10.95
Ultimate Wizard 10.95
Adv. Construction . . 25.95
America's Cup 22.95
Arctic Fox 22.95
Autoduel 31.95
Bard's Tale 25.95
Bard's Tale II 25.95
Chickamauga 23.95
Battlefront 25.95
Carriers At War 31.95
Europe Ablaze 31.95
Lords of Conquest . . 22.95
Marble Madness 20.95
Moebius 25.95
Murder Party 22.95
Ogre 25.95
Pegasus 23.95
Reach For The Stars . 30.95
Road To Moscow 25.95
Robot Rascals 25.95
Russia 25.95
Scrabble 22.95
Chessmaster 2000 . . 25.95
Ultima 1 . . . . . 25.95
Ultima 3 . . . . . 31.95
Ultima 4 . . . . . 38.95
World Tour Golf 23.95

INFOCOM

Call for items and prices

EST. 1982
ComputAbility

P.O. Box 17882, Milwaukee, WI 53217
ORDER LINES OPEN
Mon.-Fri. 11 a.m. - 7 p.m. CST • Sat. 12 p.m. - 5 p.m. CST

To Order Call Toll Free

800-558-0003

For Technical Info, Order Inquiries, or for Wisc. Orders

414-357-8181

TELEX NUMBER 9102406440

No surcharge for Mastercard or Visa

ORDERING INFORMATION: Please **specify system.** For fast delivery send cashier's check or money order. Personal and company checks allow 14 business days to clear. School P.O.'s welcome. **C.O.D. charges are $3.00.** In Continental U.S.A. include $3.00 for software orders. 4% shipping for hardware, minimum $4.00. MasterCard and Visa orders please include card #, expiration date and signature. WI residents please include 5% sales tax. HI, AK, FPO, APO, Puerto Rico and Canadian orders, please add 5% shipping, **minimum $5.00.** All other **foreign orders add 15% shipping, minimum $10.00.** All orders shipped outside the Continental U.S.A. are shipped first class insured U.S. mail. If foreign shipping charges exceed the minimum amount, you will be charged the additional amount to get your package to you quickly and safely. All goods are new and include factory warranty. Due to our low prices all sales are final. **All defective returns must have a return authorization number.** Please call (414) 357-8181 to obtain an R.A. # or your return will not be accepted. Prices and availability subject to change without notice.

NOTE: Monitor not available. The Plus/4™ can hook up to your TV.
FREE!
WITH PURCHASE OF COMPLETE SYSTEM
20 TOP GRADE FLOPPY DISKS
RETAIL VALUE
$59.90
Ideal for home or business! Perfect for programmers!

COMMODORE PLUS/4

COMPLETE COMPUTER SYSTEM

AT BELOW DEALER COST!

Factory new!

Factory warranted by Commodore®. Built-in software for word processing, data processing, spreadsheets and 128 color graphics!

Commodore® designed this Plus/4™ specifically for **programmers and small businesses!** And then they made it **VERY EASY** to learn and use for novices. Popular business software is available for a variety of purposes. For programmers, this machine has easy-to-use powerful commands and 60K of usable memory. Can hook up as many as four disk drives.

Team up the computer with our compatible units of famous brand, factory reconditioned and warranted **DISK DRIVE** and **DOT MATRIX PRINTER!** Sorry, we can't print the brand name of the disk drive and printer. But phone us Toll-Free and we can tell you. With Disk Drive for data storage and Printer for "hard copies", you'll have a complete system...at low liquidation prices. Order **TODAY!**

Additional Features of
COMMODORE PLUS/4
Data base of 999 records. Computer holds 99 lines of text before it must be transferred to disk drive. Excellent terminal for use with modem. 128 colors available for graphics. Split screen and windowing capabilities Compatible with all Commodore hardware except joystick and dataset. NOT compatible with C64 software.

DISK DRIVE
Intelligent, high-speed. External 5¼" floppy diskette recorder. 2K RAM, 16K ROM. Maximum storage of 170K formatted data: 35 tracks. Uses single sided, single density disk. Serial interface. Second serial port for chaining second drive or printer. Data transfer rate of 400 bytes per second.

DOT MATRIX PRINTER
Bi-directional. 6 x 7 dot matrix impact printer. 60 characters per second. Has upper and lower case letters, numerals and symbols. All PET graphic characters. Standard friction feed. Maximum of 80 columns width, dot addressable. CBM, ASCII character codes. Original plus maximum of two copies. Paper width: 4.5" to 8.5". Size: 13"W x 8"D x 3¼"H. Weight: 6½ lbs.

Units sold individually or in any combination you desire.

	Original List Price	YOUR COST
PLUS/4 COMPUTER Item H-1046-5035-001 Ship. hand. $8.00	$299.00	$79
DISK DRIVE Item H-1046-3553-013 Ship. hand. $8.00	$269.00	$169
PRINTER Item H-1046-3831-005 Ship. hand. $7.00	$200.00	$119
TOTAL Ship. hand. $23.00	$768.00	$367

JOYSTICK
Deluxe cosmetic, Robust construction Joystick. Comfortable rugged hand grip, 8-Directional control, will automatically come back to the center when you let it free. Heavy duty base with strong/stabilizing suction cups. Four highly sensitive, light touch fire buttons. Two fire buttons on heavy duty base. Other two fire buttons on control handle. Extra strong, high conductivity leaf type directiona/fire contacts be built in. Auto and quick fire electronic circuit included.

JOYSTICK $12.95
Item H-1046-4035-001 Ship, hand: $3.00

COMPLETE SYSTEM
WITH 20 FREE FLOPPY DISKS
Total Original List . . . $827.90
Liquidation Priced At Only . . . $349
Item H-1046-5035-019 Ship, hand: $19.00

Credit card customers can order by phone.
MasterCard VISA

Toll-Free: 1-800-233-6345

S & S LIQUIDATION DIVISION
A division of S & S Wholesalers
226 Lincoln Rd., Miami, FL 33139

S & S LIQUIDATION DIVISION Item H-1046
A division of S & S Wholesalers
226 Lincoln Rd., Miami, FL 33139

Send ___ **COMPLETE SYSTEM(s)** Commodore® Plus/4™ Disk Drive, Printer and Floppy Disks Item H-1046-5043-019 at **$349** each plus $19 each for ship, handling.
Send ___ **Commodore® Plus/4™ COMPUTER(s)** Item H-1046-5035-001 at $79 each plus $8 each for ship, handling.
Send ___ **DISK DRIVE(s)** Item H-1046-3553-013 at **$169** each plus $8 each for ship, handling.
Send ___ **PRINTER(s)** Item H-1046-3831-005 at **$119** each plus $7 each for ship, handling.
Send ___ **JOYSTICK(s)** Item H-1046-4035-001 at **$12.95** each plus $3.00 each ship, handling.
Charge: ☐ MasterCard® ☐ VISA® ☐ C.O.D.
Acct. No. _____ Exp. ____/____
PLEASE PRINT CLEARLY
Name _____
Address _____
City _____
State _____ ZIP _____
Phone (___) _____
Sign Here _____

NEW VERSION 3.0 FOR C64 & C128 IN 128 MODE.

THE MIRROR

DISK COPIER

$24.95

NO FINER OR MORE ADVANCED ARCHIVAL COPIER AVAILABLE AT ANY PRICE.
EASY TO USE. DOES NOT CAUSE DRIVE HEAD TO KNOCK.
COPIES UP TO 41 TRACKS.
PERIODIC UPDATE POLICY.
AUTOMATICALLY MAKES BACK-UP COPIES FROM VIRTUALLY ALL PROTECTED SOFTWARE.
NIBBLES, HALF TRACKS, COPIES EXTRA SECTORS AND EXTRA TRACKS.
REPRODUCES ALL DISK ERRORS AUTOMATICALLY.
FAST, COPIES FULL DISK IN AS LITTLE AS 4-7 MINS. EVEN COPIES ITSELF.

WE COPY MORE!
MASTERCARD, VISA, M.O. OR CHECK OK
+ $3 SHIPPING & HANDLING
C.O.D. OR FOREIGN ORDERS ADD $2
CALIF. ORDERS ADD 6% SALES TAX
— WRITE OR CALL —

Compumed

VISA

(408) 758-2436
P.O. BOX 6939
SALINAS, CA 93912
FOR COMMODORE 64 AND 1541 DRIVE
OR COMMODORE 128 AND 1571 DRIVE

You Have a Choice.

Numeric Keypads

CP Numeric Keypad, Deluxe Model.

- Top quality, low profile key switches for smooth, reliable data entry.
- Easily connected with computer keyboard.
- No software is required. 100% Compatible with all programs.
- Available for Commodore 64, SX-64*, VIC-20 and Apple IIe Computers.
- One year warranty and available in three models:

Regular $49.95

Plus $59.95

Deluxe $69.95

Power Supply

- Has better features than the original one at $39.95.
- Is serviceable, NOT disposable.
- Works dependably with one year warranty.
- For Commodore and Atari* Computers.

Computer Place (213) 325-4754
23914 Crenshaw Blvd. Torrance, CA 90505

* Requires adaptor at additional cost. VISA, MC & AE accepted. No C.O.D. Add $3.00 shipping. CA residents add 6.5% sales tax. Dealer inquiries welcome.
Commodore 64, SX-64 and VIC-20 are trademarks of Commodore Business Machines, Inc. Atari is the trademark of Atari Corp., Apple IIe is the trademark of Apple Computer, Inc.

OUR PRICES WON'T BYTE

ABACUS

Basic 128	$42.95
Basic 64	29.95
Cadpak 128	45.95
Cadpak 64	29.95
Chartpak 128	29.95
Chartpak 64	29.95
Cobol 64	29.95
Cobol 128	45.95
Super C Compiler 64/128	42.95
Super Pascal	45.95

BRODERBUND

Where in the World is Carmen Sandiago	$21.95
P/S Library 1-2-3 ea	15.95
Print Shop	26.95
Print Shop Companion	21.95
Toy Shop	39.95
P/S Holiday Library	15.95

MICROLEAGUE

General Manager Disk	$24.95
Micro League Baseball	24.95
Team Disks	16.95

RIBBON

Axiom Elite 5 LCD	$ 5.95
Brother 15, 25, 35	5.95
Commodore 1525	6.95
Commodore 1526	6.95
Epson 185	6.95
Epson 85	4.95
Epson mx, fx, rx 100	6.95
Epson mx, fx, rx 80	4.95
Gorilla Bananna	6.95
Juki 6000	4.95
Juki 6100	3.95
Legend 880, 1080, 808	6.95
MPS 801	6.95
MPS 803	6.95
OKI 182, 192	9.75
OKI 82, 92, 83, 93	2.25
SG 10-15	2.25

(Min. 6 per order)

INFOCOM

Enchanter	21.95
Hitchhiker's Guide	21.95
Invisiclues ea	6.00
Leather Goddesses of Phobos	21.95
Spellbreaker	26.95
Trinity 128	24.95
Zork 1-2-3 ea	25.95

DATAEAST

Commando	$21.95
Karate Champ	21.95
Kung Fu Master	21.95
Tag Team Wrestling	21.95

GAMESTAR

Baseball	$21.95
Basketball 2 on 2	21.95
Football	21.95

PRECISION

Superbase 128	$56.95
Superbase 64	46.95
Superscript 128	47.95
Superscript 64	46.95

TIMEWORKS

Data Manager 128	$42.95
Data Manager II	29.95
Partner 128	42.95
Swift Calc 128 w/Sideways	42.95
Swift Calc 64 w/Sideways	29.95
Word Writer 128 w/Speller	42.95
Word Writer 64 w/Speller	29.95

DIGITAL SOLUTIONS

Pocket Filer 128	$31.95
Pocket Filer 64	24.95
Pocket Planner 128	31.95
Pocket Planner 64	24.95
Pocket Writer 128	31.95
Pocket Writer 64	24.95

MICROPROSE

Conflict in Vietnam	24.95
Crusade in Europe	24.95
F-15 Strike Eagle	21.95
Gunship	21.95
Silent Service	21.95
Top Gunner	18.95

SPRINGBOARD

Certificate Maker	$29.95
Clip Art I	20.95
Clip Art II	24.95
Clip Art III	24.95
Newsroom	29.95
Graphic Expander	21.95
Certificate Maker#1	21.95

ACCESS

Leader Board	$24.95
L.B. Tournament Disk	14.95
Mach 128	30.95
Mach 5	21.95
10th Frame	24.95
Triple Pack	14.95

HOT SELLERS

Star Fleet 1	$29.95
Commando	21.95
Gato	19.95
Kung Fu II	19.95
Tag Team Wrestling	21.95
Strike Force Cobra	13.95
X-15 Alpha Mission	19.95

DATASOFT

Alternate Reality	$24.95
Conan	27.95
Crosscheck	19.95
Goonies	18.95
Mercenary	18.95
Mind Pursuit	18.95
Never Ending Story	18.95
Gunslinger	19.95
221B Baker St	19.95
Theatre Europe	21.95

ACCESSORIES

WICO Boss Joystick	$11.50
WICO Bat Handle Joystick	15.50
WICO Three Way Joystick	18.95
Xetek Graphic Interface	54.95
Xeket Graphic Jr	34.95
RS 232 Interface	34.95
Master Moderm	34.95
Flexidraw Light Pen	74.95
Disk Notcher	5.95
AICP Disks (10)	7.95
Drive Cleaner	7.95
Disk Storage Case (70)	8.95

ELA

Bard's Tale	$24.95
Chessmaster 2000	26.95
Lords of Conquest	24.95
Marble Madness	21.95
Mind Mirror	21.95
Moebius	26.95
Movie Maker	24.95
Orge	26.95
Ultima IV	39.95
Ultimate Wizard	22.95
Bard's Tale II	27.95
Auto Duel	34.95
Scrabble	22.95
America's Cup	22.95
Artic Fox	22.95

MINDSCAPE

Bop and Wrestle	$18.95
Dolphins Rune	18.95
Fairlight	18.95
High Roller	18.95
Indoor Sports	18.95
Infiltrator	18.95
Halley Project	18.95
Lords of Midnight	17.95
Quake 1	17.95
Luscher Profile	18.95

BERKELEY SOFTWARE

GEOS	$36.95
GEOS Fontpak 1	18.95
GEOS Desk Pack	22.95
Writer Work Shop	31.95
Geodex	24.95

AVALON HILL

Superbowl Sunday	$19.95
Team Disk	12.95

SOLID STATE SOFTWARE

VizaStar 128	$79.95
VizaWrite 128	59.95

ACCOLADE

Dambusters	$18.95
Fight Night	18.95
Hard Ball	18.95
Law of the West	18.95
PSI 5 Trading Comp	18.95
Kill Until Dead	18.95
Ace of Aces	18.95
Decptor	12.95

ACTIVISION

Alter Ego	$29.95
Cross Country Road Race	19.95
Mindshadow	19.95
Murder on the Mississippi	21.95
Rocky Horrow Show	18.95
Shanghai	21.95
Spindizzy	18.95
Transformers	21.95
Tass Times in Tonetown	21.95
Gamemaker	24.95
Gamemaker Sci/Ficition	14.95
Gamemaker Sports	14.95
Hacker II	21.95
Music Studio	21.95
Aliens	21.95
Labyrinth	21.95
Howard the Duck	21.95
Portal	25.95

EPYX

Fast Load	$23.95
Multiplan 64/128	29.95
Programmers Toll Kit	27.95
Vorpal	21.95
World Karate Championship	18.95
World's Greatest Baseball	23.95
Super Cycle	24.95
World Games	24.95
World's Greatest Football	24.95
Movie Monster	24.95
Championship Wrestling	24.95
Destroyer	24.95
Winter Games	23.95

FIREBIRD

Elite	$19.95
Colossus Chess-IV	21.95
Frankie Goes to Hollywood	21.95
Music Systems	24.95
Advance Music Systems	49.95
The Pawn	28.95
Battle of Britain/ Battle for Midway	13.95
ARC of Yesod/ Nodes of Yesod	13.95
StarGlider	24.95
Tracker	24.95

SUBLOGIC

Flight Sim II	$34.95
Football	27.95
Jet	27.95
Pure Stat Baseball	34.95
Scenery Disk 1-6 ea	14.95
Stadium Disk (baseball)	14.95

BATTERIES INCLUDED

Paperclip II	$49.95
Consultant 64/128	36.95
Paperclip w/Spell 64	28.95

CALL US TOLL FREE

Orders 1-800-634-AICP Only

Customer Service

718-351-1864

10AM to 6PM

E.S.T.

AMERICAN INTERNATIONAL COMPUTER PRODUCTS

P.O. Box 1758

Staten Island, N.Y. 10314

ORDER INFO

In stock items shipped within 24 hrs. for prepaid orders (cert. check, visa, mc) C.O.D. Orders accepted, please add $4.00, must be cash or cert. check ONLY. NYS residents add 8¼% sales tax. Advertised prices reflect a 4% discount for cash, credit card add 4% All orders add $3.50 shipping and handling within the Continental U.S. International orders add $15.00 shipping and handling. Personal checks allow 2 wks. for clearance. Availability and pricing subject to change without notice. Free shipping in Continental U.S. on software orders over $150.00. DEFECTIVE EXCHANGE ONLY FOR SAME PRODUCT. Restocking fee on unopened no-defective items returned. Returns accepted within 15 days of shipping date only. All returns require Return Authorization numbers. School inquires invited. WE DO NOT GUARANTEE COMPATIBILITY.

COMB

Authorized Liquidator

COMMODORE® VICMODEM™

- **Use with the Commodore® C64™, the SX-64 or the VIC-20 Computer.**
- **Bell 103 Compatible.**
- **Full Duplex; 300 Baud.**
- **Manual Dial Direct Connecting.**
- **FCC Registered.**

This Modem is **LOW liquidation priced** because it was closed out by Commodore®. Add it to your computer for access to timely financial information, news and reference libraries...as near as your phone! An affordable introduction to phone/computer services; and you can communicate with computer users who also own modems!

Use with data cassette (included), or with terminal program software, available at computer stores.

90-Day Limited Factory Warranty.

List: $59.00

Liquidation Priced At Only $19

Item H-2294-7041-072 Ship, handling: $4.00 ea.

Commodore is a registered trademark of Commodore Electronics, Ltd.

VISA MasterCard DISCOVER AMERICAN EXPRESS

Credit card members can order by phone, 24 hours a day, 7 days a week.

Toll-Free: 1-800-328-0609

Sales outside the 48 contiguous states are subject to special conditions. Please call or write to inquire.

SEND TO: **Item H-2294**
C.O.M.B. Direct Marketing Corp.
1405 Xenium Lane N/Minneapolis, MN 55441-4494

Send ___ **Modem(s)** Item H-2294-7041-072 at $19 each, plus $4 each for ship, handling. (Minnesota residents add 6% sales tax. Sorry, no C.O.D. orders.)

☐ My check or money order is enclosed. (No delays in processing orders paid by check.)

PLEASE CHECK: ☐ VISA ☐ MasterCard ☐ DISCOVER ☐ AMERICAN EXPRESS

Acct. No. _____ Exp. ___/___

PLEASE PRINT CLEARLY

Name _____

Address _____

City _____

State _____ ZIP _____

Phone (___) _____

Sign Here _____

COMB COMB COMB

THE LOWEST PRICES | THE BEST SERVICE

ELECTRONIC ONE®

PHONE LINES OPEN 10-6 E.S.T. M-F

CALL (614) 864-9994 • P.O. Box 13428 • COLUMBUS, OHIO 43213

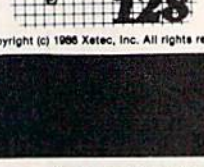
commodore

HARDWARE		SOFTWARE		SOFTWARE SPECIALS	
64C 64k COMPUTER	169.99	GEOS	39.99	ACE	9.99
128C 128k COMPUTER	239.99	PRINT SHOP	27.99	Z PILOT	6.99
1541C DISK DRIVE	179.99	PRINT MASTER	27.99	COBRA	9.99
1571C DISK DRIVE	229.99	NEWSROOM	39.99	KUNG FU FIST	9.99
1802C MONITOR	189.99	MACH 5	22.99	KUNG FU STICKS	9.99
1902A RGB MONITOR	279.99	MACH 128	27.99	SARGON II	6.99
1702 MONITOR	179.99	FAST LOAD	24.99	SARGON III	22.99
COMPUTER ACCESSORIES		TURBO LOAD & SAVE	17.99	JUKE BOX	2.99
1351 MOUSE	39.99	WORD PRO W/TURBO	22.99	STORY MACHINE	2.99
M-1 MOUSE	34.99	WORD PRO 128 W/FILE	22.99	ALPHABET ZOO	2.99
128k UPGRADE	109.99	SPREADSHEET	22.99	DELTA DRAWING	2.99
512k UPGRADE	159.99	PROGRAMMER'S TOOL BOX	12.99	COSMIC LIFE	2.99
COMMODORE 300 BAUD MODEM	49.99	FILE PRO 64	18.99	ALF COLOR CAVES	2.99
COMMODORE 1200 BAUD MODEM	129.99	POWER C	22.99	UP FOR GRABS	2.99
MESSENGER MODEM	34.99	JANE	34.99	FACE MAKER	2.99
AVATEX 1200 MODEM	79.99	PAPER W/SPELL	28.99	ZORK 2	4.99
AVATEX 1200 HC MODEM	119.99	SUPERBASE 64	49.99	ZORK 3	4.99
PRINTERS		SUPERBASE 128	59.99	CHESS	4.99
STAR NX10	199.99	POWER ASSEMBLER	29.99	SUSPENDED	4.99
STAR NX10C	219.99	SAT	12.99	STARCROSS	4.99
STAR SG10C	189.99	POCKETWRITER 64	27.99	DEADLINE	4.99
STAR POWER TYPE	179.99	CERTIFICATE MAKER	28.99	SATINS' HOLLOW	4.99
PANASONIC 1080i	189.99	PRINT SHOP COMPANION	22.99	RALLY SPEEDWAY	4.99
PANASONIC 1091i	259.99	DATA MANAGER 128	39.99	HARDBALL	18.99
SEIKOSHA 1000 VC	179.99	WORD MANAGER 128	39.99	MICRO LEAGUE BASEBALL	18.99
		SWIFT CALC 128	39.99	SUPERBOWL SUNDAY	18.99
				SUPERBOWL STATS	14.99

HOW TO ORDER: CASHIER CHECK, MONEY ORDER, MASTERCARD® OR VISA® (ADD 4% FOR CHARGE CARDS) . . . NO PERSONAL CHECKS . . . NO C.O.D.'s . . . SHIPPED U.P.S. . . . ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.
SHIPPING: ADD $3.00 ON ALL ORDERS UNDER $100.00 . . . ADD $5.00 ON ALL ORDERS OVER $100.00. ACTUAL FREIGHT CHARGED ON MULTIPLE ORDERS.
INTERNATIONAL: ACTUAL FREIGHT CHARGED ON ALL ORDERS OUTSIDE THE CONTINENTAL UNITED STATES INCLUDING A.P.O.
POLICIES: NO RETURNS WITHOUT A RETURN AUTHORIZATION . . . NO RETURNS UNLESS DEFECTIVE. ALL DEFECTIVES WILL BE EXCHANGED . . . NO EXCEPTIONS PLEASE SPECIFY . . .

CALL OR WRITE FOR FREE CATALOG

CALL ELECTRONIC ONE (614) 864-9994 OR WRITE



Xetec **$59.95**

Copyright (c) 1986 Xetec, Inc. All rights reserved

A powerful word processing system for the Commodore 128

Includes: • On screen status/help display • 45 Fonts ready to use • Font editor/creator included • Foreign Language Disk

From the author of *FONTMASTER II* comes ***FONTMASTER 128***, an enhanced version for the Commodore 128. This powerful word processor, with its many different print styles (fonts), turns your dot matrix printer into a more powerful tool. Term papers, newsletters and foreign languages are just a few of its many applications. Here are some of its capabilities:

NOW WITH NO COPY PROTECTION — USES HARDWARE KEY

Word Processing Features

- Over 65 powerful commands make text editing a breeze
- 45 + Fonts (includes Russian, Greek, Hebrew, Arabic)
- Room for 9 SUPERFONTS concurrently
- Text memory: approximately 64k Bytes
- Supports more than 100 printers
- 80 columns
- PRG file merge
- File names can be picked from disk directories
- 4 keyboard macros
- Headers/footers
- Page number in decimal or Roman
- On screen underlining/highlighting of text blocks
- On screen status display, including pictures of fonts
- New font preview displays printer output on screen
- On screen bi-lingual editing
- Form letter/data merging
- Multi-color help screens
- Right-to-left editing features for foreign languages
- Loads in approximately 15 seconds with 1571 drive
- New formatters for inserting graphics into documents

Word Processing Printing Features

- 50 + two-letter format controls (embedded in text files)
- Fractional character spacing used on word-wrap, justification, centering, and right alignment
- Proportional spacing (user-adjustable)
- Columnar printing (up to 4 columns)
- Overlaying of 2 or more characters (for phonetic markings, diacritics, etc.)
- 30 single-keystroke text modifiers (embedded in text files)
- Combine any or all of the following effects: underlining (adjustable) · more than 20 pitches · more than 50 line spacing sizes · condensed text · boldfacing · inversion (white letters on black) · superscripts (adjustable) · 3 text heights (micro-normal-tall)

Setup Module

- Two system setups can be made. In each, user can select his preference of colors (screen, text, cursor), printer interface (20 choices), and printer (over 100 choices)

Font & Character Set Creators

- Disk commands for maintenance of fonts or sets
- Grid for character creation/redding (manipulated with cursor keys, joystick, or light pen)
- Editing commands include: invert, flip, negate, shift, clear, copy
- Character can be printed while editing (font creator only)

Bauhaus	Futura	Monogram	Stencil
Broadway	Goodtype	News	Stop
Burgondy	Hairpin	Olde English	Tech
BUSORAMA	Italic	Pierrot	ФУБСОЦЖ
Celtic	Manhattan	Print	ABΞΔΕΦΓΗ
Chromefire	ΣΟΠΠΙΜ	Script	ב־ד־ה־ת
Freehand	âçƒδμ°!	Shaddow	яБЧДеФгх

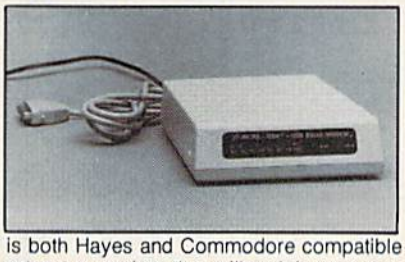
Xetec, Inc. • 2804 Arnold Road • Salina, KS 67401 • (913) 827-0685

The Great Communicator

Direct-connect Hayes/Commodore® 1670 compatible 1200 Baud modem for ONLY $119.95.

Now that you're able to do all those stand alone applications with your Commodore, like word processing, spread sheet analysis, and many others, you are probably thinking "It would sure be nice if I could expand the amount of data I have access to." You are quite right, everything from Electronic Mail (E-mail) to stock quotes and huge databases of every imaginable type is now on line to the small computer owner. You can even send and receive telexes anywhere in the world. All you need is a telephone and a modem which allows your computer to communicate with others through these many services.

The next question is: "Which modem is best for me?" Let me first say that almost all modems (and services) are set up to communicate in one of two speeds; 300 and 1200 Baud. If you look around you will find that there is a flood of 300 baud modems on the market and sometimes at very low prices. The reason is simple, they are being dumped because most computer users prefer 1200 Baud. (1200 Baud is about 4 times as fast which means you spend less time and money getting the data you want and more time enjoying it.) Virtually everyone who has a 300 would rather have a 1200. You will also notice a few very cheap 1200s on the market at "too good to be true prices". They are. The reason is that they are either not truly Hayes and/or Commodore compatible therefore not usable in all situations and with all services.



The Aprotek-1200C is both Hayes and Commodore compatible and 1200 baud. Why not get a modem that will satisfy your present AND future needs by going directly to an inexpensive Aprotek-1200C especially when we have it on sale?

What do you get for $119.95? Everything! You don't need to worry about cables, compatibility or anything else! We don't just sell hardware, we sell solutions. The Aprotek-1200C plugs directly into your Commodore Vic-20, C-64, C-64C or C-128 user port. It is unique in that it has two separate (switchable) emulation modes (Hayes and Commodore 1670) to make it compatible with all available software. The Aprotek-1200C is a full feature, 300 and 1200 Baud modem with Auto Answer, Auto Dial. Touch-Tone or rotary dialing, has the full complement of 8 status LEDs on the front panel and has a built in speaker with volume control. Just plug it into your computer and standard phone jack with the supplied cables. Also included is a free trial offer subscription to Quantum-Link, a very useful Commodore user database with local access numbers and about every feature imaginable.

Do you have more than one computer or do you plan to get another computer? You can have your cake and eat it too. Simply order our Universal RS-232 interface #5232 along with the standard Aprotek-1200 which you can use with any computer that has a RS-232 serial port as well as your Commodore.

NO RISK POLICY
Try the Aprotek-1200 for two weeks and if you are not satisfied, send it back for a prompt refund.

The bottom line:

Aprotek-1200C (for Commodore)
order #1200C.....$119.95

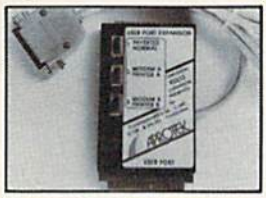
Aprotek-1200 (for RS-232 with DB-25)
order #1200.....$119.95

Modem shipping—Cont. US $5.00, UPS Blue $10.00

UNIVERSAL RS-232 INTERFACE

with Commodore User Port expansion.ONLY $39.95 + shipping

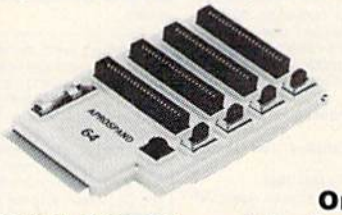
Now you can connect and communicate with any of the popular RS-232 peripherals using your Commodore User Port. You can even connect more than one and leave it permanently attached. This superb expander opens a whole new world to your Commodore computer's capabilities. You can now connect to printers, modems and any other RS-232 devices. If you already have a device that connects to the User Port, don't worry because the port is duplicated on the outside edge of the interface. Simply plug it in and turn on the device you want to communicate with. Comes complete with sample driver program listings. Compatible with all Commodore home computers with a user port. 1-year warranty. **Order #5232.**



Aprospand-64™

Gives your Commodore 64 or 128 full expandability!This superbly designed expansion module plugs into the expansion port & gives you 4 switchable (singly or in any combination) expansion connectors —plus fuse protection—plus a reset button! Before you buy an expander, be sure that it has a fuse to protect your computer and that you can activate your cartridges in **any** combination allowed by the cartridges.

The Original



Fully C-128 Compatible

Order # 5064

NOW ONLY $29.95 + shipping

NEW! ***"EXTENDER-64"*** allows you to place your Aprospand-64 (or any other cartridge expander) in a more convenient location. This device is a 10" section of ribbon cable with male and female connectors that allows you to place your cartridges to the side of, rather than in back of, your computer. This puts your cartridges and switches within easy reach.

ONLY $19.95 + shipping. **Order #5065**

Commodore Interfaces and Cables

Cardprint G-WIZ Printer Interface #1108	$46.95
Commodore Serial Extension Cables	$Call
Amiga Printer Cable (6 ft) #3040-6MF	$17.95
Amiga Printer Cable (10 ft) #3040-10MF	$21.95
Commodore 6 Pin Serial Cable (5 ft) #3006-5MM	$ 6.95
Commodore 6 Pin Serial Cable (8 ft) #3006-8MM	$ 8.95

Shipping per above items: $3. Cont. US $6. CAN,PR,HI,AK,APO,UPS Blue

PRINTERS

	Price & Shipping
Aprotek Daisy 1120, 20 CPS, Order #1120	$279.95 + $11.00
Auto Cut-Sheet Feeder, Order #1110	$185.00 + $7.00
Tractor Feed, Order #1112	$ 75.00 + $5.00

SEIKOSHA

SP-1000VC (C-64) Order#2200	$163.95 + $10.00
SP-1000 Apple IIc, Mac Order #2300	$184.95 + $10.00
SP-1000 IBM Order #2100	$184.95 + $10.00
SP-1000 Serial Order #2500	$184.95 + $10.00
SP-1200AI Order #2600	$199.95 + $10.00
MP-1300AI 300 CPS, #2700	$449.95 + $12.00
MP-1300 Color Kit Order #2705	$119.95 + $ 5.00
BP-5420 420 CPS Order #2800	$949.95 + $27.00

ORDER INFORMATION California residents add 6% tax. All prices are cash prices—VISA and MC add 3% to total. We ship the next business day on money orders, cashier's checks, and charge cards. A 14-day clearing period is required for checks. Prices subject to change— CALL. Dealer inquiries invited.

For information and in Calif. call **805/987-2454**
TO ORDER CALL TOLL FREE
1 (800) 962-5800 (7-7 PST)

Or send order to:

Dept CG

APROTEK

1071-A Avenida Acaso
Camarillo, CA 93010

C-64™ • VIC™ • SX-64™ • C-128™ • Plus 4™ • C-16™ • B-128™ • PET™ • CBM™

Why spend $150 on software for a $200 computer?

The Intelligent Software Package: One disk, 25 business programs, $19.95

The **Intelligent Software Package** is the one product for your Commodore that can take care of all your data processing needs.

Customers write: *"What a bargain!"*
"I am amazed at all there is in these programs."
"This letter is to tell you that your package is absolutely the best I have found."
"At last! Something to make my computer do real work."

There are no hidden fees for shipping or documentation, and no clubs to join. The package is not public domain software, and is sold only direct to customers by mail: it supports all available printers, and will run on any Commodore computer (except Amiga) with a minimum of 10k RAM, including the C-128 in C-128 mode.

What you get when you order the Package:

Database—A complete database manager. All fields completely user-definable. Can be used for any number of tasks, including accounting, checkbook and tax records, mailing lists, inventory control, catalog maintenance, or as an electronic rolodex. A customer writes: *"I am especially impressed with Database, and have used it to replace a half-dozen other 'database'-type programs I had been using."*

Word Processor—A full-featured menu-driven word processor. Allows full control over margins, spacing, paging, indentation, and justification. *"Highly recommended."* — Midnite Software Gazette. *"Provides good basic features."* — Compute's Gazette.

Copycalc—An electronic spreadsheet. *"Excellent program for budgeting, estimating, or any math-oriented use . . . well worth the money. Highly recommended."* — Midnite Software Gazette.

ReportGen—creates form letters, mailing lables, etc.

ReportMerge—creates statements invoices.

Baseball Stats—compiles team batting statistics.

Index—indexes W/P's text files.

WPConvert—converts files to other WP formats.

DBMerge—facilitates relational D/B applications.

DBStat, DBStat2—analyze D/B files.

ASCII—converts text files into program files.

Checkbook—reconciles checkbook.

Inventory—Maintains inventory records.

Paper Route—A/R for paper route.

Loan Analysis—computes finance terms, prints schedules.

Breakeven—computes breakeven analysis.

Depreciation—creates depreciation schedules.

Labeler—creates labels.

File Copier—copies sequential, program files.

Correlation—calculates statistical correlation.

Also other Database and Word Processor utilities.

To order, send name, address, and $19.95 to address below. Please specify regular (1541/1571/2040/4040/2031) disk, 8050 disk, or cassette (cassette not available for Plus 4 or C-16). Add $3 for COD orders; credit cards not accepted. Calif. residents add 6%. No personal checks from outside USA. A sampling of program output is available for $1. **Tear this ad out and keep it handy!**

Intelligent Software
Quality Software since 1982

Box A Dept. G-2
San Anselmo, CA 94960
(415) 457-6153

FACTORY AUTHORIZED

COMMODORE REPAIR CENTER

1-800-772-7289
IN ILLINOIS (312) 879-2888

C64 Repair (pcb only)	42.95*	AMIGA Repair	CALL
1541 Repair	79.95*	Other CBM Equip.	CALL
1541 Permanent Alignment	29.95*	C64 Power Supply	34.95
C128 Repair (pcb only)	79.95*	CBM & AMIGA PARTS	Call (312) 879-2350

*Includes parts, labor & UPS return shipping. APO/FPO or Air Freight add $10.00

CALL BEFORE SHIPPING, VISA, MASTERCARD OR MONEY ORDER
24-48 Hrs. Turnaround (Subject to parts availability)
Diagnosis fee of $25.00 for any unit altered or with no defects.

SAVE YOURSELF SOME MONEY

Due to our vast experience in repairing 64s we have found that the power supply is a major cause of board failures. By inserting our device between the power supply and computer over 63% of our customer's repairs would have been avoided. For only $19.95 our Over Voltage Sensor will continuously monitor your power supply output. If an overvoltage occurs the Over Voltage Sensor will prevent damage to your 64.

64 OVER VOLTAGE SENSOR $19.95
(Plus $3.00 Shipping/Handling)

TEKTONICS PLUS, INC.
150 HOUSTON STREET
BATAVIA, IL 60510

CLIP AND SAVE

ATTENTION

ALL COMMODORE 64/64C, VIC 20, COMM. 16 AND COMMODORE 128 OWNERS

A complete self-tutoring BASIC programming course is now available. This course starts with turning your computer on, to programming just about anything you want! This course is currently used in both High School and Adult Evening Education classes and has also formed the basis of teacher literacy programs. Written by a teacher, who after having taught the course several times, has put together one of the finest programming courses available today. This complete 13 lesson course of over 220 pages is now available for the **COMMODORE 64/64C, VIC 20, COMMODORE 16** and the **COMMODORE 128** and takes you step by step through a discovery approach to programming and you can do it all in your leisure time! The lessons are filled with examples and easy to understand explanations as well as many programs for you to make up. At the end of each lesson is a test of the information presented. Furthermore, ALL answers are supplied to all the questions and programs, including the answers to the tests. Follow this course step by step, lesson by lesson, and turn yourself into a real programmer! You won't be disappointed!

We will send this COMPLETE course to you at once for just $19.95 plus $3.00 for shipping and handling (U.S. residents, please pay in U.S. funds). If you are not COMPLETELY satisfied, then simply return the course within 10 days of receipt for a FULL refund.

FOLLOW UP COURSE

Now available! a 200 page course exclusively on sequential and relative files using a unique approach for those with very limited file programming experience - set up your own personal and business records! — disk drive a must — same author — same guarantee — same cost— this course for all computers except Vic 20.

Fill in the coupon or send a facsimile.

CG

NAME:_____

ADDRESS:_____

CITY:_____

PROV./STATE:_____

POSTAL/ZIP CODE:_____

I desire the BASIC programming course for:
Comm. 64 / 64C ☐ **Vic 20** ☐
Comm. 128 ☐ **Comm. 16** ☐

I desire the FOLLOW-UP ☐ **course on relative and sequential files for all above computers but Vic 20 .**

Any complete course: $19.95
Postage and Handling: $3.00
Total: $22.95

Send Cheque or Money Order to:
Brantford Educational Services
6 Pioneer Place,
Brantford, Ontario,
Canada N3R 7G7

NEW

KRACKER JAX® REVEALED!

THE BOOK

At last—**Kracker Jax** takes you beyond the protection barrier! The secrets of un-protecting software are yours with **Kracker Jax** revealed!

We'll show you exactly how to defeat five different protection schemes encompassing scores of current programs. Our tutorial has twenty specific examples to lead you, step by step, to a new level of knowledge. Here's what you get:

- **Kracker Jax revealed.**
- **A reset switch.**
- **A utility disk.**
- **20 parameters on disk.**

ONLY $23.50 COMPLETE!

Orders outside of North America
Please add $7.50 for shipping and handling.
Please allow two weeks for delivery.

Flash— **KRACKER JAX *voted "MOST INNOVATIVE COPY PROGRAM OF 1986" by The Guide Magazine!***

AND HERE'S WHAT SOME OF OUR CUSTOMERS HAVE TO SAY ABOUT US:

"I really enjoy doing business with you—your attitude is great!" Richard Libby.

"Very impressed with your product—thanks." Larry Lyman, Director, Green Mountain Commodore User's Group.

"I am excited about **Kracker Jax Revealed**—thanks again for the great product & great service." Jerry Pectol.

"Very nice utility—about time someone looked out for us." John Dale, President, Wiregrass Micro-Comp Society.

See our reviews in the Jan. '87 Ahoy! and in the Dec. '86 issue of The Guide.

KRACKER JAX® PROTECTION BUSTERS
BLAST DISK PROTECTION

ARE YOU CAUGHT UP IN THE COPY PROTECTION ARMS RACE?

DEFEND YOURSELF WITH KRACKER JAX® A REVOLUTION IN ARCHIVAL SOFTWARE!

Kracker Jax is the powerful parameter copy system that is taking the country by storm! What IS a parameter! It's a custom program that allows your 1541 or 1571 disk drive to strip all copy protection from your expensive software, leaving you with UNPROTECTED, TOTALLY BROKEN back-ups that can even be copied with a simple fast copier. Each Volume costs $19.95 and will un-protect around 100 titles. So why pay for backups of programs that you already own?

Check out some of these exclusive features:

- **Kracker Jax** is the BEST program of its kind!
- **Kracker Jax** will back up titles that the nibblers CAN'T!
- **Kracker Jax** requires NO special knowledge to operate!
- **Kracker Jax** strips protection in a matter of SECONDS!
- **Kracker Jax** is priced RIGHT—just $19.95 per Volume
- **Kracker Jax** is UNPROTECTED—easy to back up!
- **Kracker Jax** updates are available QUARTERLY!

VOLUME FIVE INCLUDES A POWERFUL NEW C64/C128 FAST COPIER!

ALL NEW VOLUME FIVE
VOL. 1-4 STILL AVAILABLE. ONLY $19.95 EACH!

KRACKER JAX® PROTECTION BUSTERS
BLAST DISK PROTECTION

THE SHOTGUN

Those of you who have used our **Kracker Jax** parameters know just how good they are. Can you imagine the kind of nibbler we could put out? Well, you don't have to imagine it because it's HERE! **THE SHOTGUN,** our new premium nibbler utility, is available two ways:

- **THE SHOTGUN** by itself—offered to you at the unheard of introductory price of only $14.95!
- **THE LOADED SHOTGUN**—Packaged WITH 32 of the most popular **Kracker Jax** parameters ever created—only $19.95!

Whichever version you order, you'll find **THE SHOTGUN** to be loyal to the **Kracker Jax** tradition of more quality for less money.

THE MSD DUAL CANNON

MSD owners aren't left out in the cold anymore! The all new **MSD DUAL CANNON** gives you state of the art control over your advanced equipment! You get:

- **A NIBBLER**—for backing up your protected programs!
- **A FILE COPIER**—for easy file maintenance and manipulation!
- **A SECTOR EDITOR**—developed just for the MSD dual drive!
- **And a FAST COPIER**—that WON'T transfer errors—perfect for use with data disk or **Kracker Jax** parameters!

Start getting the full performance that your MSD drives are capable of delivering. You already *know* you own the finest drives available—so why settle for anything less than the best utilities made for them?

Get the most out of your special equipment—only $34.95!

ON-LINE HELP

Are you programming in BASIC? Let your C-64 help you! Forget about all those tattered books and charts—just load **ON-LINE HELP** in at the beginning of a session. Then, at the touch of the F1 key, you're given a menu of available help screens to choose from! When you return to BASIC, you're right back EXACTLY where you left off!

ON-LINE HELP gives you 17 screens of info at the touch of a button, including: *ASCII character set/POKES/color codes/selected DOS commands/useful memory commands/BASIC keywords, abbreviations, and token values/sound registers/musical notes in all 8 octaves/location 197 last key pressed.*

Never waste time hunting for basic information again—only $19.95

SUPER CAT

If you had the time and skill to create your own custom disk catalog system, the paramount system of your wildest dreams, it probably STILL wouldn't have all the features of **SUPER CAT!** For example: • Catalog up to 640 disk directories—1280 with 2 drives! • Index & alphabetize over 5000 titles—10000 with 2 drives! • Unique ID's are NOT necessary!/A printer is NOT required! • Find ANY title in 10 seconds—sort 1000 titles in 8 seconds! • Automatic entry with Selection, Edit, and Cross Ref. options! **SUPER CAT** has literally too many features to fit in here. From the easy, menu driven work screens to the comprehensive output options, **SUPER CAT** is the most powerful and complete disk catalog system available today!

The ultimate software library index system—only $24.99

THE C-128 CANNON

Here's the package you C-128 owners have been waiting for! The **C-128 CANNON** gives you more power than you ever hoped for! Just look at some of these capabilities:

- **NIBBLER**—Works with single or dual 1571/1541 drives!
- **FAST COPIER**—Great for data disks or use with Kracker Jax!
- **FILE COPIER**—Makes file maintenance and manipulation easy!
- **1581 FAST COPIER**—For use with the new high speed 3.5" drive!
- **1581 FILE COPIER**—For high speed file manipulation!
- **MFM COPIER**—Copies unprotected IBM and CP/M disks!
- **T/S EDITOR**—Works with 1541, 1571, and the new 1581 drives!
- **ERROR SCANNER**—Complete with on-screen display!
- **DENSITY SCANNER**—Check for altered densities track by track!
- **DIRECTORY EDITOR**—Alter & organize your disk directories!
- **KRACKER JAX**—You also get 100 of our most popular parameters!

You've seen nibblers alone that sold for thirty-five or forty dollars. And the 100 **Kracker Jax** parameters are a twenty dollar value. Yet the ENTIRE **C-128 CANNON** utility package sells for just $34.95. Never before has this much power and control been integrated into a single, affordable product. If you own a C-128, you deserve the **C-128 CANNON!**

C-128 owners, this is the package of your dreams—only $34.95

COMPUTER MART

Need more info? Call or write for our free catalog

Program submissions wanted! Good Commissions—National Marketing.

CHECKS, MONEY ORDERS OR VISA/MASTERCARD.
Mail your order to: Computer Mart, Dept. G
2700 NE Andresen Road/Vancouver, WA 98661
Phone orders welcome: 206-695-1393
Same day shipping/No C.O.D. orders outside U.S.

VISA
MasterCard

PLEASE NOTE: Free shipping & handling on all orders • C.O.D. add $3.00 to total order • All orders must be paid in U.S. funds.

1541 DISK DRIVE ALIGNMENT PROGRAM

A complete disk drive alignment program! No special equipment needed! A two disk (program and calibration) program allows anyone with average mechanical skills to properly align the 1541 disk drive. Complete intstruction manual. Don't be fooled by cheap imitations! This is the alignment program that works!

$44.95

PROGRAM PROTECTION MANUAL FOR THE C-64 . . . . . $29.95

PROGRAM PROTECTION MANUAL VOLUME 2 . . . . . $34.95

SNAPSHOT 64 . . . . . $49.95

SNAPSHOT 64 ENHANCEMENT DISK $14.00

SOURCE GENERATOR $34.95

EPROM PROGRAMMER HANDBOOK $32.95

CARTRIDGE BACKER II $54.95

CSM SOFTWARE

P.O. Box 563, Crown Point, IN 46307
(219) 663-4335

VISA AND MASTER CARDS ACCEPTED
DEALER INQUIRIES INVITED
Shipping $3.50 Per Item in U.S.; Foreign Orders Extra

THE AMAZING VOICE MASTER®

ENTER THE FINAL FRONTIER OF MAN-TO-MACHINE COMMUNICATIONS

There is nothing else like it. Voice Master gives both speech output and voice recognition with this single hardware product! Your voice controls programs, or home appliances, robots, and more with spoken commands. Verbal response back gives status, verifies, or requests your reply! Speech output and recognition patterns are recorded in with your voice. Or use the voice of your friend, boss, teacher, mother, even the family pet! Programming is simple with new commands added to BASIC. A music bonus program lets you write and compose musical scores simply by humming the tune. Unlimited applications for fun, education, and commercial use. Design your own programs for profit. Speech and recognition quality unsurpassed by even the most sophisticated machines. Only Covox provides this high-tech marvel at a price less than most common peripherals.

The Covox Voice Master comes complete with all hardware and software for only $89.95. (Add $4 shipping and handling for USA, $6 Canada, $10 overseas.) Available for Commodore 64/128, Apple II, II+, IIc, IIe, Atari 800, 800XL, 130 XE. Specify when ordering. Visa, MasterCard phone orders accepted.

Call or write for FREE Voice Master infopak and special combination package offers.

COVOX INC., DEPT. CG
675-D Conger Street • Eugene, Oregon 97402 • U.S.A.
Area Code (503) 342-1271 • Telex 706017 (Av Alarm UD)

PANASONIC 1080i — $199.95
1091i — $259.95

MCS

DISKS 5¼ DS/DD . . $ .40
3½ DS/DD . . $1.50

BY COMMODORE
AMIGA™ 1000*
PLUS
1080 Color Monitor

90 DAYS PARTS & LABOR
$850
C.P.U. IS REFURBISHED

- Future Sound . . . $139.95
- DIGI-VIEW $159.95
- 1080 Monitor . . . $259.95
- Enhancer . . . . . $ 14.95

SIDECAR
GEN LOCK
CALL!

- 256K RAM . . . . . $ 79.95
- 1680 Modem . . . $159.95
- Allegra (512K) . . $299.95
- Amega (1 Meg) . $399.95

NEW ***LOW*** PRICES!

- 64C . . . $169.95
- 128 . . . . $249.95
- 1541C . . $179.95
- 1571 . . . $219.95
- 1351 . . . $ 39.95
- 1670 . . . $119.95
- 1802C . . . . CALL
- 1902 . . . . . CALL

CALL US BEFORE YOU BUY!

Over 2400 software titles in stock!

NEW! star PRINTERS

NP 10
$159.95

- NX10 . . . . . $199.95
- NX10C $219.95
- NL10 . . . . . $249.95
- NX15 . . . . . $319.95

FULL LINE — CALL!

commodore
SFD 1001

1 MEG $179.95

SEIKOSHA SP-1000VC
COMMODORE READY
$164.95
NEAR LETTER QUALITY
FRICTION & TRACTOR
100 CPS
SHEET FEEDER

1200 BAUD
FROM **$88.00**

2400 BAUD

commodore
Educator 64
$199.95

Commodore Compatible

commodore PC10-1
IBM Compatible

- 512K
- 360K Dual Sided Drive
- CGA Board
- One year warranty
- Parallel Port
- Serial Port
- GW BASIC
- DOS 3.2

FREE Sidekick by Borland
$699.95

ORDERS ONLY **800-433-7756**
HOURS: MON-FRI 10:00 a.m. - 8:00 p.m. E.S.T.
SAT 10:00 a.m. - 6:00 p.m.
Customer Service
Dealer Inquiries **313-427-0267**

JOYSTICKS FROM $ 5.95
INTERFACES FROM $ 29.95
OKI-MATE 20 $184.95

MC/VISA/DISCOVER/C.O.D. — Please include phone number. Dealer inquiries invited, all prices discounted for cash or check. Call for shipping information. All returns are for repair/exchange only, call for auth. Prices and availability subject to change without notice. Offices are not open for walk-in traffic.

You can have THE fastest most powerful DOS available for your 64/1541.

Load 39 blocks per second!

Introducing **DigiDos** — *THE* fastest Dos enhancement on the market coupled with *THE* most powerful GCR nibbler and real-time monitor!

DigiDos is a hardware addition to your 1541 disk drive and your Commodore 64 that gives you amazing speed for *ALL* disk functions (loads 39 blocks per second!, compared to the normal 2 blocks per second), and coupled with our GCR Nibbler you have the most powerful disk backup system available (archives programs others can't even touch). Also included in **DigiDos**: full feature real time monitor, powerful DOS wedge, versatile utilities, and handy single keystroke commands. All this with **NO** loss of available memory!

DigiDos is *NOT* a cartridge! Utilizing state of the art technology **DigiDos** incorporates a custom kernal ROM and EF ROM installed directly in your 64 and 1541 alongside your original kernal ROM and requires minimum installation.

For those concerned with program compatibility — with the flip of a switch **DigiDos** completely disappears returning you to your original Commodore kernal. After you have installed **DigiDos** you will also have a new safe system reset button!

DigiDos provides a powerful wedge that includes all the normal DOS wedge commands plus: locking and unlocking files on disk, unnew, a fast parallel disk directory (that does not disturb memory), screen dump, autorun, and list — all with single keystroke commands.

Included with **DigiDos** is a Floppy Disk of custom utilities and tools for further DOS enhancement.

You can have the fastest, most powerful DOS available for the 64 for only $59.95 plus $3.50 postage and handling ($5.00 additional for C.O.D.). Our product is being shipped *NOW* and comes complete with all necessary parts.

At DigiTek, Inc. we are continuing in our commitment to customer support and satisfaction. For more information or to order your DigiDos send your check or money order to: DigiTek, Inc., 10415 N. Florida Ave., Suite 410, Tampa, Florida 33612, or call (813) 933-8023.

DigiTek, Inc.
10415 N. Florida Ave., Suite 410
Tampa, Fla. 33612 • (813) 933-8023

Advertisement

Commodore 64 SOFTWARE Only $5/Disk

- ☐ **105 Artist Sketchbook** — drawing programs $5
- ☐ **106 Great American Novelists** — word processing
- ☐ **107 Phone Connections** — communications $5
- ☐ **108 Space Wars** — space games $5
- ☐ **109 Dungeons & Dragons** — text adventures $5
- ☐ **110 Home Orchestra** — instrument simulation $5
- ☐ **111 Juke Box** — prerecorded songs ... $5
- ☐ **112 Einstein's Favorites** — advanced math $5
- ☐ **113 Ponzo's Tutor** — programming from BASIC to machine $5
- ☐ **114 Electronic Secretary** — filehandling utilities $5

Add $4 shipping & handling per order. CA residents add 6.5% sales tax

Amount enclosed $_____ ☐ Check ☐ VISA ☐ MasterCard

Card No. _____

Signature _____ Exp. Date _____

Phone (_____) _____

Name _____

Address _____

City _____ State ____ Zip _____

Call toll free **800-431-6249** in Calif. **415-952-1994**

BLACKSHIP COMPUTER SUPPLY C110

P.O. Box 883362 San Francisco, CA 94188

NEW! Take The Heat Off Your 64/128 Drive!

Overheating and line surges are a major cause of frustrating program malfunctions and permanent damage to your Commodore disk drive. Now, for the first time, you can protect your investment with the COM-COOL PLUS™ Cooling Fan/Surge Protector.

1. Washable filters remove dust **before** forcing air through.
2. Quiet fan can cool two stacked disk drives.
3. Foam base holds unit firmly in place.
4. Protected outlets clip spikes at a safe 130V. Replaceable fuse.
5. Pilot lights monitor power, ground and SURGE protection.

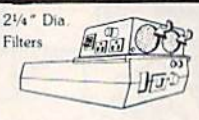
Two models for use with Commodore 1541 or 1571 drives.

COM-COOL PLUS™ $59.95
Cooling Fan/Surge Protector

COM-COOL™ $39.95
Economical cooling unit (does not include surge suppression and line filter)

COM COOL and COM COOL PLUS are trademarks of AIER Products. Commodore ltd is a registered trademark of Commodore Electronics Ltd

2¼" Dia. Filters



AIER

AIER PRODUCTS
522 West Bergen
Milwaukee, WI 53217
414-277-9120

CS Distributed exclusively by:

COMPUTER SOFTWARE SERVICE • A CHAS. LEVY CIRCULATING COMPANY
495-A Busse Road, Elk Grove Village, IL 60007-2114 • In IL call: 800-331-SOFT
DEALERS ONLY CALL: **1-800-422-4912**

DSI

DIGITAL SOLUTIONS INC.

SERVICE CENTER

Commodore®

C-64	Repair (CPU only)	$ 38.95
1541	Alignment	$ 25.00
1541	Repair	$ 69.95
C-128	Repair (CPU only)	$ 74.95
1571	Alignment	$ 35.00
1571	Repair	$125.00
C-64	Power Supply	$ 21.95
C-128	Power Supply	$ 89.95

Includes parts and labor
(Power Supply extra)

To save C.O.D. charges, send unit and power supply with check or M.O. to:

DIGITAL SOLUTIONS, INC.
1122 9th Street
Altoona, PA 16601
(814) 944-0405

MasterCard VISA DISCOVER

© 1986 DSI ALTOONA PA

LEARN PROGRAMMING

MASTER COMPUTERS IN YOUR OWN HOME

Now you can write programs and get a computer to do just what you want. Get the most out of any computer, and avoid having to pay the high price of pre-packaged software.

LEARN AT YOUR OWN PACE IN YOUR SPARE TIME

Our independent study program allows you to learn about computers, operations, applications and programming in your spare time, at home. Our instructors provide you with one-on-one counseling.

LEARN EVEN BEFORE YOU DECIDE ON A COMPUTER

Everything is explained in simple language. You will enjoy learning to use a computer—EVEN IF YOU DON'T OWN ONE. Learn to program on any personal computer; IBM, APPLE, COMMODORE, TRS, and more.

BE YOUR OWN COMPUTER EXPERT

Programming is the best way to learn to use computers, and we can show you the best—and most economical—way to learn programming! Send today for your free information package. No obligation. No salesman will call.

halix INSTITUTE — CENTER FOR COMPUTER EDUCATION
1543 W. Olympic # 226 Los Angeles, CA 90015-3894

HALIX INSTITUTE CENTER FOR COMPUTER EDUCATION DEPT. 62-4
1543 W. OLYMPIC # 226 LOS ANGELES, CA 90015-3894

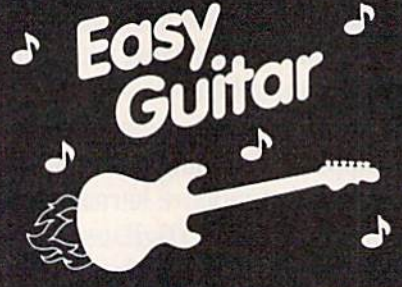
YES! Send me information on how I can learn about computers and programming at home!

Name _____ Age _____

Address _____

City _____ State/Zip _____

Learn to PLAY THE GUITAR the EASY way with Easy Guitar



Order today and be on your way to fame and fortune! Easy Guitar is the equivalent of dozens of guitar lessons.

C-64 disk

$29.95 plus $2.00 shipping & handling

VISA & MC Accepted
or send check or money order to:

PJ SOFTWARE
10636 Main St., #414 • Bellevue, WA 98004
(206) 883-9257
Dealer inquiries welcome

DUST COVERS

- ★ CUSTOM MADE TO FIT
- ★ HEAVY 32-oz. VINYL ANTI-STATIC
- ★ EXTENDS EQUIPMENT LIFE
- ★ Choice of Colors Light Tan or Brown

COMPUTERS	
C-64; Plus 4	8.00
C-128	13.00
Datassette (C2N)	5.00
Amiga 1000	13.00
(W/Amiga Mon. Stacked)	28.00
Keyboard only	7.00
Atari 800XL, 130XE	10.00
Atari 520 ST	14.00
IBM PC XT	28.00
IBM 5051 Keyboard (Dimensions Required for IBM Clones)	8.00

DISK DRIVES	
C-1541, C-1571	8.00
Amiga 3½" D Drv	8.00
Amiga 5¼" D Drv	9.00
Indust GT, MSD SD-1	8.00
MSD SD-2	10.00
Enhancer 2000	8.00
FSD-1	8.00
Atari 1050	8.00

VIDEO RECORDERS 13.00
State Make & Model Include Dimensions

PRINTERS	
C-1525/MPS 801	10.00
C-1526/MPS 802	13.00

PRINTERS	
C-MPS 803, C-1520	8.00
Panasonic 1090/91	13.00
Gemini 10 & Star 10's	13.00
Gemini 15 & Star 15's	16.00
Okidata 92	13.00
Okidata 120/192	13.00
Okimate 10/20	8.00
Epson MX/FX/RX80	13.00
Epson LX80/C-1000	13.00
Seikosha SP-1000	13.00
Comrex 220	13.00
C'Itoh 7500	13.00
Citizen MSP 10	13.00
Atari 1027	13.00
C DPS 1101	16.00

MONITORS	
Atari SC 1224 RGB	19.00
C-1702, BMC Color	16.00
C-1902 Amiga	19.00
Amdek 500-700	19.00
Teknika MJ 10/22	19.00
CM-141 (C-1802)	19.00
Gold Star 13" Color	19.00
Thompson CM 365-66	19.00
C-1902A Magnvx 40	19.00
Magnavox 80	19.00
NEC 1225	19.00
Taxan 220	19.00
Sakata SC-100	19.00
Zenitth 122/123	19.00
Zenith 131/133	23.00

Order by stating MAKE, MODEL and COLOR CHOICE TAN or BROWN with check or money order plus $1.50 per item ($4.50 max.) shipping and handling (Foreign air extra). Calif. Res. include 6.5% State Tax.

SPECIAL COVERS WILL BE MADE TO YOUR DIMENSIONS. SEND YOUR REQUIREMENTS FOR OUR LOW PRICE QUOTES.

Crown Custom Covers
24621 PAIGE CIRCLE, DEPT. A
LAGUNA HILLS, CA 92653
(714) 472-6362

Classified

SOFTWARE

$$ WIN WITH THOROUGHBRED, Harness & Greyhound handicapping software: $29.95 Enhanced: $49.95. Pro Football Handicapping System: $39.95. For most computers. Free info. Software Exchange, Box 5382 CG, W. Bloomfield, MI 48033. Call: (800) 527-9467

ARB BULLETIN BOARD FOR THE 64 & 128
300–1200 Baud, Punter/Xmodem/ASCII
AUTO MESSAGE FORWARDING-ARB NETWORK
Vote, Matchmaker, Quiz, 27 SIGS
Con't Story, SOURCE CODE & More! $64.95
(BBS) 718-645-1979 * (Voice) 718-336-2343
L&S Computers, PO Box 392, Bklyn, NY 11229

If you'd like information on the latest version of your software, please call or write:
Batteries Included Customer Support, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5 (416) 881-9816

COMMODORE: TRY BEFORE YOU BUY.
Best selling games, utilities, educational + classics and new releases. 100's of titles.
Visa/MC. Free brochure. RENT-A-DISC, Frederick Bldg. #345, Hunt'n, WV 25701 (304) 529-3232

HI-RES PLOTTING FOR C64. Easily create graphs, plots for presentations, school and business. Features autoscaling, three fonts, dumps for Epson, Star, and CBM printers. Save graphic images & data to disk. $24.95. Latenite Software, PO Box 175, Plainfield, IL 60544

FREE SOFTWARE for C64, C128, IBM & CPM
Send SASE for info (specify computer) to:
PUBLIC DOMAIN USERS GROUP
PO Box 1442-A4, Orange Park, FL 32067

COLORFUL VIDEO TITLE MAKER AND STORE ADVERTISING SOFTWARE USES YOUR PRINT SHOP (TM) FONTS AND DESIGNS, $14.95. PRINT MASTER (TM)/GEOS (TM) VERSIONS (C128), $11.95 ea. from MicroAds, 145 E. Norman Dr., Palatine, IL 60067

NEW PROGRAMMING FUN FOR C64-128
Make Funny Animated KEYBOARD CARTOONS also LIVELY Prog. Titles & Games. Learn with easy Demodisk + Instr Book **$12.95** ppd. LOCKHART DEV., POB 214, Palm City, FL 33490

ARTIFICIAL INTELLIGENCE language LISP!
Lisp interpreter for C64 with 140 page manual, Source Code, Tutorial & Sample Programs. Send $39.95 to List Processing Software, Box 3422, Rapid City, SD 57709

BEGINNING RUSSIAN PLUS POLITBURO GAME for C64 on disk or tape $19.95. Start to learn Russian! Russian Software, PO Box 43242, Fayetteville, NC 28309

LEARN HOW TO BEAT THOSE POKER MACHINES! with No Joker Poker, an exciting C64/128 draw poker game. Only $9.95. Dusty Nagle, Box 127, Gilbert, WV 25621 (304) 664-8482

****** BBS CONSTRUCTION KIT 128 & 64 ******
Design and make your own customized BBS! For more info write: Powersystems, PO Box 822, Coventry, RI 02816 * BBS 401-822-4605

GEOpaint graphics disk / for non-artists
Good selection-$8.50 disk (ch/mo) to:
THOSE DESIGNERS, 3330 Lewis Avenue, Signal Hill, CA 90807 (213) 427-6742

Use your photos, slides or drawings with your C64/128 programs and computer art. Images digitized and returned on disk. Specify cropped or full-frame for each image and your graphics program. We can not be responsible for loss or damage of materials - send copies. Min. order $15 for 3 images, $3 ea additional image + $2 s/h (CA res add 6% tax, Foreign add $4 US) ch/mo. YORE PHOTO (TM), Dept. A, PO Box 1269, Twenty-nine Palms, CA 92277

BRIDGEBRAIN "...is fun." Reviewed in Aug. 1986 ACBL Bulletin. User-friendly Contract Bridge for C64. $40 or SASE for info.
G. Bodnar, 1134 Harvard Cr, Pittsb, PA 15212

FAMILY TREE Pedigree Charts, Fam Grp Records, Files, Indexes, Searches. 3 versions... 64, LDS, 128. $49.95 + $2 s/h.
GENEALOGY SOFTWARE, POB 1151, PT HURON, MI 48061 (519) 542-4424

Upstart Publishing Adds Power to SpeedScript© 3.0–3.2! Great news from the author of Script-Save and SS Customizer. /WURDS/: Webster's Dictionary for SpeedCheck. 15k+ words entered by frequency in Am Eng for speed. $17 + s/h. /SPEEDMATE/: SS 3.x customizer. Set/save margin defaults, 30+ print codes. PRINT PREVIEW 80 COLUMNS on screen at once, readable chars, no horiz scrolling! $17 + s/h. /SPEEDPAK/: SS3.x enhancer: Edit/cut/paste between two texts at once, add text macros, help, encryptor, mail merge, Dvorak, ASCII conv $17 + s/h. (s/h charges: US/CAN $3, Foreign $6 per ord) (NC res add 5% tax) Send SASE for FREE info. MC/Visa orders call: (919) 379-9732. UPSTART PUBLISHING - G74, POB 22022, GREENSBORO, NC 27420

HARDWARE

COMMODORE CUSTOM CHIPS for C64/128 @ low prices. 24 hour delivery by Federal Exp. 6510/6526: $9, 6567: $15, 6581: $11, PLA/S100: $12, plus others. New Repair Guide just out. Kasara Microsys, 33 Murray Hill Dr., Spring Valley, NY 10977 800/642-7634, 914/356-3131

COMPUTER REPAIR - C64: $45, 1541: $50
Parts available. MAJOR COMPUTER SERVICES, Rte. 6, Box 806-M, Midland, TX 79703
(915) 561-8483 V/MC/COD

MISCELLANEOUS

** COMMODORE REPAIR **
C64: $45, SX64: $75, 1541: $50, 1571: $65
Will buy used units. Repairs warranted 30 days. Dave Taylor, 1506 Daventry Pl., Midland, TX 79705. (915) 683-8398

Personal Computer Owners CAN EARN $1000 to $5000 monthly, selling simple services performed by their computer. Work at home - in spare time. Get free list of 100 best services to offer. Write: A.I.M.A.Q., P.O. Box 60369, San Diego, CA 92106-8369

THE BASEBALL DATABASE

LET YOUR COMPUTER KEEP TRACK OF YOUR TEAM'S BASEBALL STATS FOR YOU!

■ **EASY TO USE** • Menu driven • clear screen directions • detailed user's manual • easy data entry • fast stats retrieval

■ **COMPREHENSIVE** • 23 player and 22 pitching stats • inning box scores • totals, cums, averages, etc. calculated • up to 30 players • unlimited games

■ **DETAILED PRINTED REPORTS** • Player rosters • win/loss records • game summaries • player, pitching and team cums • player and pitcher histories • and a lot more

We offer a 15-day money back guarantee, so don't delay. Call us with your Visa/Mastercard order or send us the coupon below with your check or MO. Program specs and details are available upon request, if you would like more information.

__ BBDB for Commodore 64/128 @ $39.95 $_____
__ BBDB for Apple IIe/IIc @ $49.95 $_____
Shipping & Handling $ 2.50
☐ Visa ☐ MC ☐ Chk/MO Total $_____
No. _____ Exp. Date _____
Tele: (_____) _____ - _____
Name _____
Address _____
City _____ ST_____ ZIP_____

JACOBSEN SOFTWARE DESIGNS
Attn: Order - CPG
1590 E. 43rd Ave., Eugene, Oregon 97405
Phone: (503) 343-8030

COMPUTE!'s Gazette Classified is a low-cost way to tell over 275,000 microcomputer owners about your product or service.

Rates: $25 per line, minimum of four lines. Any or all of the first line set in capital letters at no charge. Add $15 per line for boldface words, or $50 for the entire ad set in boldface (any number of lines.) Inquire about display rates.
Terms: Prepayment is required. Check, money order, American Express, Visa, or MasterCard is accepted. Make checks payable to COMPUTE! Publications.
Form: Ads are subject to publisher's approval and must be either typed or legibly printed. One line equals 40 letters and spaces between words. Please underline words to be set in boldface.
General Information: Advertisers using post office box numbers in their ads must supply permanent address and telephone numbers. Orders will not be acknowledged. Ad will appear in next available issue after receipt.
Closing: 10th of the third month preceding cover date (e.g., June issue closes March 10th). Send order and remittance to: Harry Blair, Classified Manager, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403. To place an ad by phone, call Harry Blair at (919) 275-9809.
Notice: COMPUTE! Publications cannot be responsible for offers or claims of advertisers, but will attempt to screen out misleading or questionable copy.

advertiser's index

Reader Service Number/Advertiser	Page
102 Abacus Software	43,45
103 Abby's Discount Software	118
104 Acorn of Indiana, Inc.	114
105 ActionSoft	2–3
106 Activision	16
107 Activision	31
108 Aier Products	130
109 American International Computer Products	123
110 Aprotek	125
111 Berkeley Softworks	10–11
112 Berkeley Softworks	13
113 Berkeley Softworks	15
114 Blackship Computer Supply	130
115 Brantford Educational Services	126
116 Cardinal Software	116
117 Central Point Software	58
118 Cheatsheet Products, Inc.	97
119 C-More Products	132
C.O.M.B. Direct Marketing Corp.	124
120 Compumed	122
121 CompuServe	4
122 ComputAbility	120–121
123 Computer Centers of America	112–113
124 Computer Mail Order	109
125 Computer Mart	127
126 Computer Place	122
127 Covox, Inc.	128
Crown Custom Covers	130
128 CSM Software	128
129 Data East	37
130 DJ Software	130
131 Digital Solutions, Inc.	BC
132 Digital Solutions, Inc.	130
133 Digitek, Inc.	129
134 Electronic Arts	IFC
135 Electronic Arts	21
136 Electronic One	124
137 Emerald Components International	69
138 EPYX	7
139 EPYX	25
140 Federal Hill Software	120
141 Free Spirit Software, Inc.	81
Halix Institute	130
142 Inkwell Systems	85
143 Intelligent I/O	120
Intelligent Software	126
144 Jacobson Software Designs	131
145 Ketek	119
146 Lionheart	75
147 Lyco	48–51
148 MCS	128
149 MicroProse Simulation Software	IBC
150 Midwest Computer Camp	82
151 Montgomery Grant	115
NRI Schools	68i
152 Precision Data	75
153 Pro-Tech-Tronics	64–65,67
154 Protecto Enterprises	54–55
S & S Wholesalers	41
S & S Wholesalers	47
S & S Wholesalers	122
Schnedler Systems	72
Second Source Engineering	116
155 The Soft Group	116
156 Software Discounters of America	117
157 Star Micronics	53
158 subLOGIC Corporation	1
159 subLOGIC Corporation	39
160 Superior Micro Systems, Inc.	114
TCO Software	114
Tektonics Plus, Inc.	126
161 Tenex Computer Express	111
162 Timeworks	19
163 Triad Computers	110
164 Tussey Computer Products	27–29
165 Ultrabyte	69
166 Unitech	82
167 Utilities Unlimited	114
168 VG Data Shack	20
169 Wenger Corporation	18
170 Xetec, Inc.	124

We Do Windows...Quickly!

C-MORE

An Operating System for the Commodore 64.

- **USE YOUR COMMODORE LIKE A PC!**
- Let C-More teach you all about business computing! Control multiple applications in windows. Word Processing, Spreadsheet, Database, Scientific Calculator, Disk Utility and Comparative-Buyer programs are all included!
- Comprehensive 450-page manual provides tutorials, step-by-step instructions, examples and illustrations, for any level user!
- **WRITE COMMODORE BASIC PROGRAMS FOR C-MORE!!**

1-800-628-2828 ext. 790

VISA Visa and Mastercard Accepted MasterCard

or mail $49.95 plus $4.50 shipping & handling

($6.00 shipping in Canada)

(Georgia residents add $2.00 sales tax)

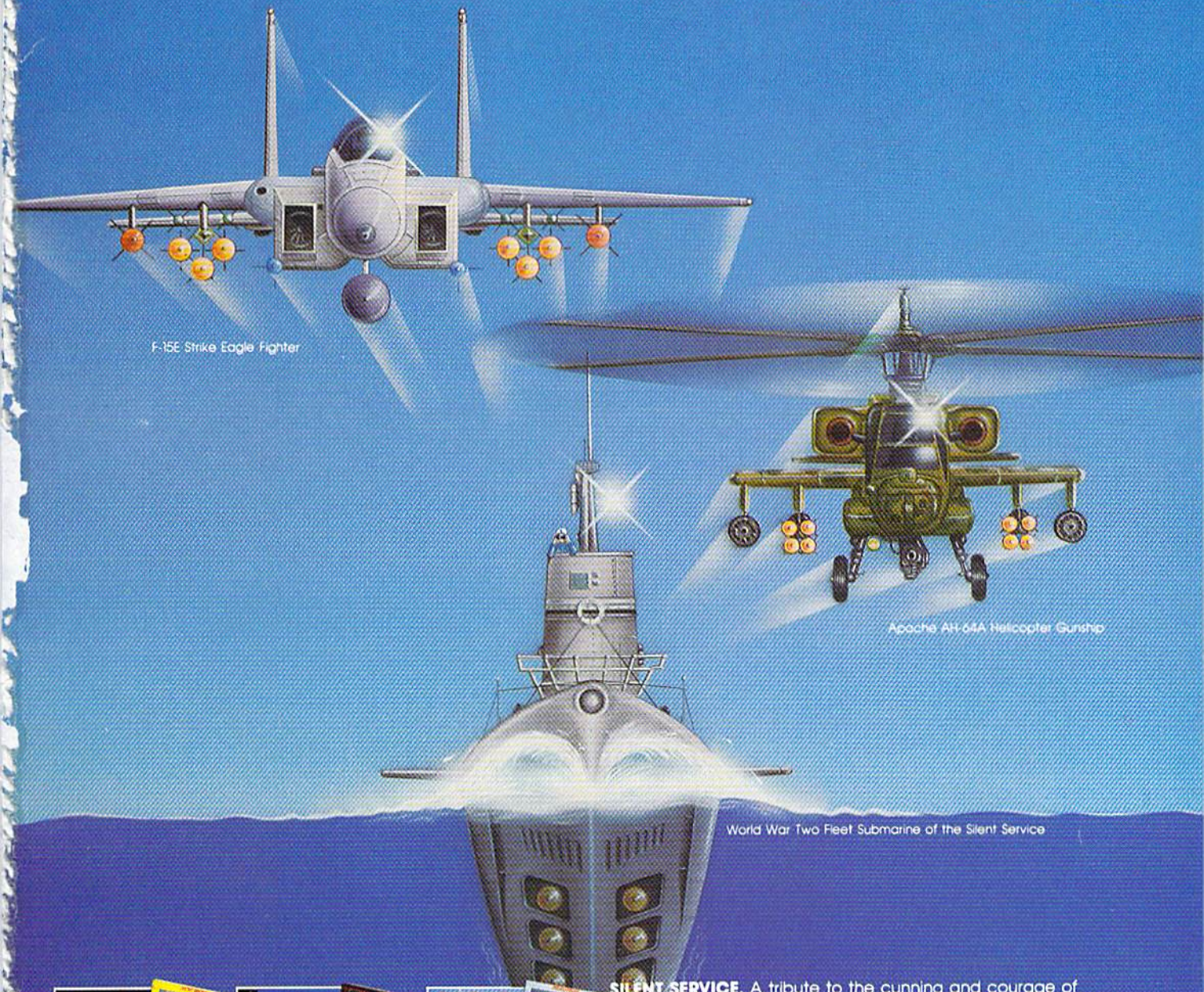
C-More Products, P.O. Box 81548 Chamblee, GA 30366

Please allow 4-6 weeks for delivery.

"Commodore" is a trademark of Commodore Electronics, Ltd.

COMPUTE! Books' Commodore 128 Collection	9
COMPUTE! Books' Commodore 64 and 128 Selections	57
COMPUTE!'s Gazette Disk Subscription	33
COMPUTE!'s Gazette Subscription	17
40 Great Flight Simulator Adventures	59
More Great Flight Simulator Adventures	61

Face to Face with Excitement!



F-15E Strike Eagle Fighter

Apache AH-64A Helicopter Gunship

World War Two Fleet Submarine of the Silent Service

There is one sure way to come face to face with the excitement of action: the stunningly realistic combat simulators of MicroProse. Authenticity is the key element that separates mere videogames from today's sophisticated simulations–it's the quality of realistic action that takes you from the world of mere fantasy and into an intriguing realm of spectacular reality. Authenticity is the essence of the MicroProse design approach; excitement is the undeniable result.

F-15 STRIKE EAGLE. The reference standard attack fighter simulation. Totally authentic cockpit flight controls and weapons systems. Missions over Iraq, Egypt, Southeast Asia–even the famous April 1986 Antiterrorist Airstrike against Libya. So realistic Soviet intelligence has reportedly purchased copies for analysis.

GUNSHIP. Helicopter warfare over the high-tech battlefields of tomorrow's headlines, with night vision systems, superb terrain representation for true 'nape of the earth' flying, and the full array of America's most advanced weaponry at your fingertips. Authentic enough to be used in actual helicopter combat environment testing for the United States Army.

SILENT SERVICE. A tribute to the cunning and courage of America's World War Two submariners. Stunningly accurate recreation of undersea warfare, with accurately reproduced torpedo characteristics, radar and sonar capabilities, and destroyer defensive tactics. So authentic that it charts the entire South Pacific to a resolution of one hundred yards. Recipient of virtually every international award as 'best computer simulation.'

Come face to face with excitement, at your MicroProse dealer.

F-15 Strike Eagle available for Commodore 64/128, Apple IIc/e/+(64k), Atari XL/XE/52OST, IBM PC/PCjr and compatibles, and Tandy 1000 Series. Gunship available for Commodore 64/128, Apple IIc/e/+(64k), IBM PC/PCjr and compatibles, and Tandy 1000 Series; coming soon for Atari XL/XE/52OST and Amiga. Silent Service available for Commodore 64/128, Amiga, Apple IIc/e/+(64k) and IIgs, Atari XL/XE/52OST, IBM PC/PCjr and compatibles, and Tandy 1000 Series. All products have suggested retail prices of either $34.95 or $39.95.

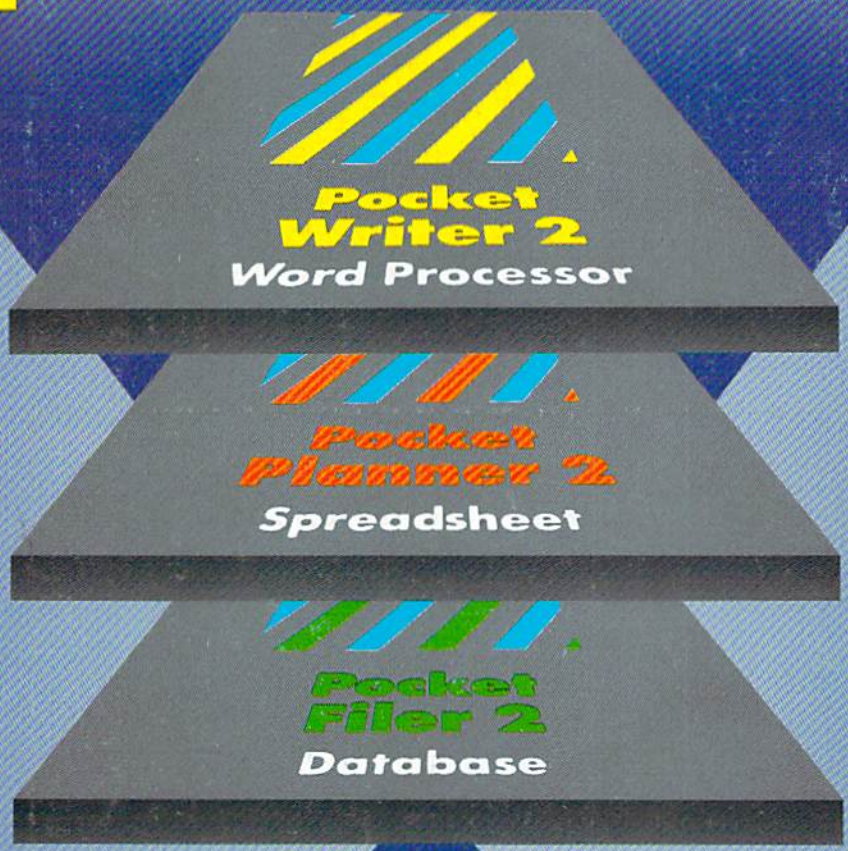
Available from your local retailer. If out of stock, contact MicroProse directly for further information on our full range of simulation software, pricing, availability, and to place Mastercard/Visa orders.

Commodore, Amiga, Apple, Atari, IBM, and Tandy are registered trademarks of Commodore Electronics, Ltd., Commodore/Amiga Ltd., Apple Computer Inc., Atari Inc., International Business Machines, Inc., and Tandy Corp., respectively.

MICROPROSE
SIMULATION • SOFTWARE

120 Lakefront Drive • Hunt Valley, MD 21030 • (301) 771-1151

Super Solutions 2



The Best Just Got Better

We just did something only the best can do! We made our award winning* software for the Commodore™ 128 and 64 computers even better!

Introducing...Pocket Writer 2/word processor **Pocket Planner 2**/spreadsheet **Pocket Filer 2**/database

Our new Pocket 2 series offers features usually found only in much more sophisticated applications software. Features that include: compatability with the new GEOS operating system†, ability to work with the Commodore RAM expander to allow a RAM disk, mouse support with pull down menus, 1571 burst mode for faster file loading, increased support for two single disk drives, automatic configuration for screen color, format and printer selection†.

Sophisticated software, yes, and still easy to use. You can be up and running in under 30 minutes even if you haven't operated a computer before.

Now, when you upgrade your Commodore™ 64 to a 128, Pocket software helps make it a breeze. The new Pocket 2 software has both 128 and 64 applications on the same disk. So when you buy one you are actually buying two software packages. The cost only $59.95 (U.S.).

Serious Software That's Simple to Use

You can buy all three Pocket 2 applications, Pocket Writer 2, Pocket Planner 2 and Pocket Filer 2 in one convenient Superpak for the low price of only $99.95 (U.S.). A super way to discover all the integrated features of Pocket 2 software and save almost eighty dollars.

As a companion to Pocket Writer 2, a **Dictionary Disk** containing 32,000 words (expandable to 40,000) is available. The cost $14.95 (U.S.).

For those of you who have already discovered the many benefits of owning Pocket software; we offer all registered owners upgrade Pocket 2 software for only $19.95 (U.S.) plus 3.00 (U.S.) shipping and handling! Available only by writing to Digital Solutions Inc.

*Commodore's Micro-computers Magazine, independent reviewers, rated the original Pocket Writer 128/64 and Pocket Planner 128/64 software the "Annual Best of 1986" in the productivity category.

International Distributor Enquiries to:

Digital Solutions Inc.

2-30 Wertheim Court
Richmond Hill, Ontario
Canada L4B 1B9
Telephone (416) 731-8775
Telex 06-964501
Fax (416) 731-8915

Superpak: The Solution That Saves Money!

Economical; $179.85 (U.S.) worth of software for only **$99.95 (U.S.)**

Canadian Dealer Enquiries:
Ingram Canada Ltd.
1-416-738-1700

Mail orders:
Crystal Computer Inc.
in Michigan
1-517-224-7667
outside Michigan
1-800-245-7316

Commodore is a registered trademark of Commodore Business Machines Inc.
†Features available for Commodore 64™
©1986 Digital Solutions Inc.